January 19

THE FOUNDRY

FIFTIETH YEAR

Our 32nd Year

...OF SERVICE TO THE INDUSTRY...

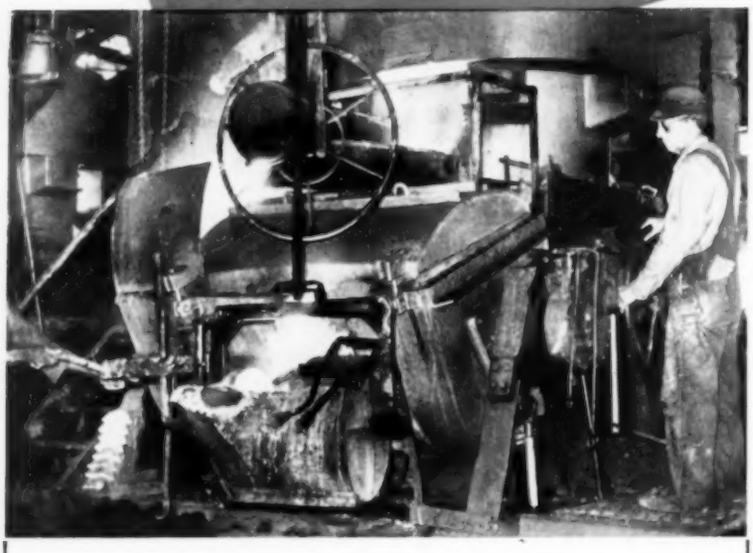
geared to meet present needs

WM. H. NICHOLLS CO., Inc.

RICHMOND HILL · LONG ISLAND · NEW YORK

Foreign Manufacturers and Selling Agents—
For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

PURITE pays you dividends... improves your castings!



U-Shaped Mixer Ladle In Operation

The cover and insulation reduce temperature losses to a minimum. This new ladle makes refining with PURITE practical for light as well as heavy castings, and for foundries melting as low as two or three tons per hour. The ladle is designed to hold the iron in contact with the PURITE slag for a period of from five to fifteen minutes for refining.

In the cupola charge, or desulphurizing in a covered mixer ladle, PURITE improves the strength and machinability of gray iron and semi-steel castings, effects lasting economies in mixture costs. It pays dividends in castings that are sounder, stronger-made from cleaner, more fluid iron.

This refining with PURITE lowers sulphur, removes inclusions and prevents segregation of impurities. It insures castings without hard spots or porous defects. And now, with the increased tempo of production, you need PURITE more than ever before. The scientific flux which gives you better, easier machining castings.

Send us a trial order today for a bag, or a ton. Let PURITE work for you on the spot, in your own foundry. Let it prove those dividends!

PURITE THE SCIENTIFIC FLUX, FOR BETTER MELTING AND CLEANER IRON

THE MATHIESON ALKALI WORKS (INC.) 60 EAST 42ND STREET, NEW YORK, N. Y.

(Licensee of Metallurgical Development Company, Inc.)

Our Mutual Task

THERE can be no better time than this beginning of 1942 to thank our customers for their unfailing patience and the consideration they have shown in the past twelve months toward our efforts to supply the myriad emergency demands for steel.

Today you as consumers and we as producers of steel have a mutual task of achieving the maximum output of materials for war. We must also produce materials for the indispensable minimum of goods for our domestic economy.

The coming of active warfare has made our mutual task as the year opens increasingly arduous. Bethlehem is exerting the utmost effort to meet unprecedented demands. It is our purpose to serve our Government to the utmost of our ability in this emergency. More than 800,000 tons of steel capacity has already been added, together with accompanying increase in coke ovens and blast furnaces, and expansion of finishing facilities. Further expansions in ingot capacity, and in rolling mills, forges and shops, are anticipated. We are purchasing a wide variety of materials from more than 10,000 suppliers. Our employment rolls have been stepped up to more than 180,000.

With all of this, the demand for our products continues unabated, and 1942 will continue to require the full cooperation and understanding between steel maker and steel user.

It is a gratifying and typical characteristic of American industry that all the needs of our Government and of our national purpose have been met on all sides during the past year with vigor and cheerfulness.

Now is added a still greater and unremitting determination. We know that there will be the whole-hearted cooperation of all, so that what needs be done, shall be done.

"Enough, if something from our hands have power,
To live, and act, and serve the future hour."

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

GREEN BOND
Pure Wyoming Bentonite. Laboratory controlled from mine to bag. The ideal sand-bonding agent.

CORE WASH
A Federal specialty. A wash for any job. Special Acme, Champion and Super are recent favorites.

CORE BINDERS
Every variety—straight or blended. The new Royal replaces from 25 to 50% of your oil.

SEACOAL
The famous Charleroi brand. Produced in seven grades to match every sand. You can't buy a better seacoal than Charleroi!

For a Fresh Start ...TRY FEDERAL

When we're all busy, the old year slips out and the new one slips in almost without notice. One foundryman recently remarked that "The only difference between January 1st and December 1st is inventory!"

To us, however, 1942 *is* different. We enter this year dedicating ourselves more than ever before to SERVICE.

As it becomes more difficult for foundries to obtain the supplies they need, we shall bend every effort to have what foundries need *when* they need it.

When you have trouble; when you can't get what you want—in short, when you want SERVICE, ... TRY FEDERAL!

PARTING
Tripoli and Non-Silica. Several brands—all thoroughly waterproofed and economical to use. You get the shake bags right in the barrels.

PLUMBAGO
A complete line for any purse or purpose.

SIFTERS
For real production, the famous Lowe Electric Riddle; and for hand-sifting, the well-known Federal Red Top Riddles.

CHAPLETS
Double Head with the patented twisted stem and Single Head with forged or welded heads.

The FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland, Ohio

CHICAGO · Seacoal Plant CHARLEROI, PA. · CHATTANOOGA, TENN. · DETROIT · MILWAUKEE · MINNEAPOLIS · NEW YORK · ST. LOUIS · RICHMOND, VA. · Mines UPTON, WYO.

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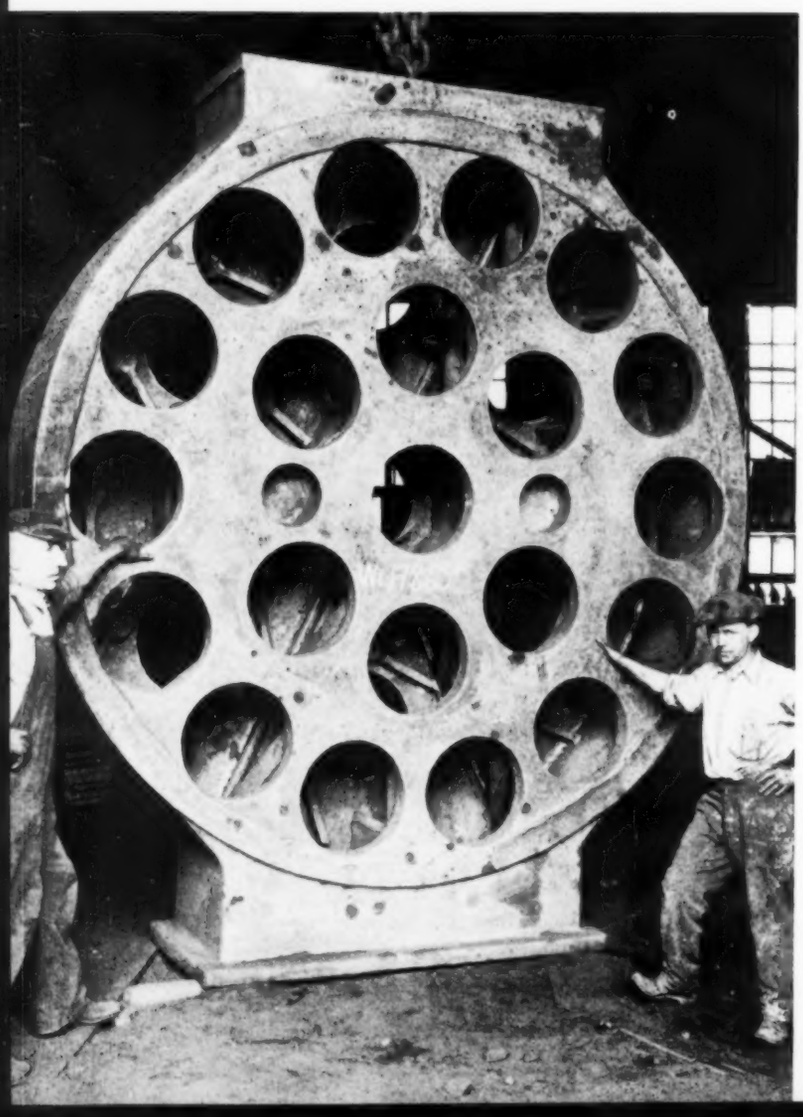
LINOIL IS APPROVED BY THE MEN WHO COUNT—THE MEN WHO KNOW—PRACTICAL FOUNDRYMEN

Approved, for one, by Bert G. Parker, President and General Manager of The Youngstown Foundry & Machine Company, Youngstown, Ohio, who says: "Our foundry has used your oil for twenty years and it is a decided asset in times like these. I am willing to endorse anything you care to say about it and you may go the limit. That's how I regard Linoil." That is how you too will value Linoil.



The 17,865-pound casting at the left is a valve housing for a blast furnace blowing engine, all Linoil cored. The one at the right is a cast iron metal planer housing. For the large rectangular work in this one pitch cores faced with several inches of core sand were used. Internal gear housings in lower portion are oil cores. The Youngstown Foundry & Machine Company makes castings up to 50 tons and prefers the use of oil sand cores wherever practicable. The ease with which Linoil cores are removed in the cleaning department more than compensates for the additional cost in making the cores.

Let's Go! AMERICA

LINOIL

The logical oil for rush times

Many things to think about today, but you can ease the load of your worries that center around core oil by adopting Linoil at once. Foundrymen whose ability you know is sound endorse it, tell you it does a good job at reasonable cost and that during the ten, fifteen, twenty-five years of their experience with it it has run uniform. What more can one ask?

Linoil isn't something you take on faith—on the other fellow's say so, whoever he is. The minute you tap the first drum things begin to happen. Less oil in the sand to make the kind of cores you want—more tons of cores per drum of oil. Speed at the core bench; speed in the oven; perfect center drying; speed in core inspection and handling; less gas, and free venting at the pour; astonishing speed in the cleaning room.

You don't need a microscope to see Linoil's advantages nor a slide rule to figure the gains of the foundry using it. A demonstration is yours for the asking, or a trial drum brings its own proofs to you.

Clear the decks for action. Clear away all uncertainty of core oil performance and put your mind to other problems. Order Linoil today.

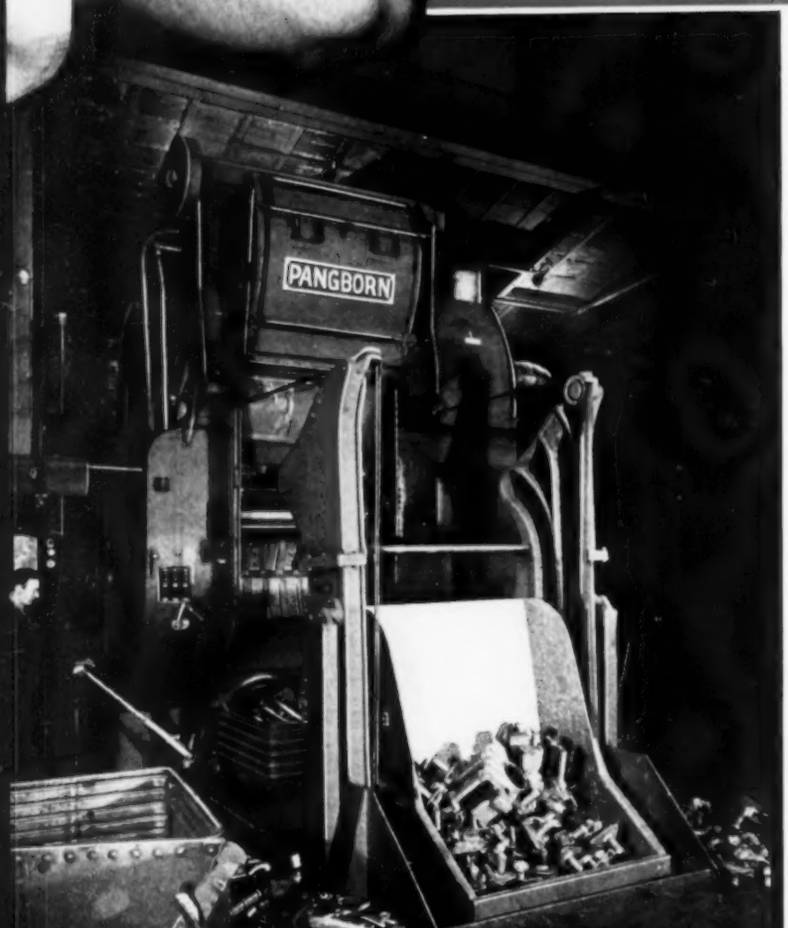
"REMEMBER PEARL HARBOR", GIVE 'EM THE CASTINGS BOYS

THE WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 West 110th Street — Cleveland, Ohio

"THUMBS UP!"



ROTOBLAST CLEANING BARREL

EVERYBODY MUST D

The British have a stirring slogan for this war. "There'll ALWAYS be an England" are the words—and the upturned thumb gives dramatic significance to their declaration. The R. A. F., the Navy, the Tank Corps, all accept the "thumbs up" salute as a pledge of courage, determination, and unlimited sacrifice—even to life itself—for a sacred cause.

Now that the black cloud of war has unleashed destructiveness upon the property and people of the United States, let us accept the "thumbs up" determination of the English people as our pledge for 1942. With all our might and main let's work together, feverishly, to get our unwanted and unsought job over successfully, quickly and thoroughly.

WORLD'S LARGEST MANUFACTURER OF BLAST

PANG

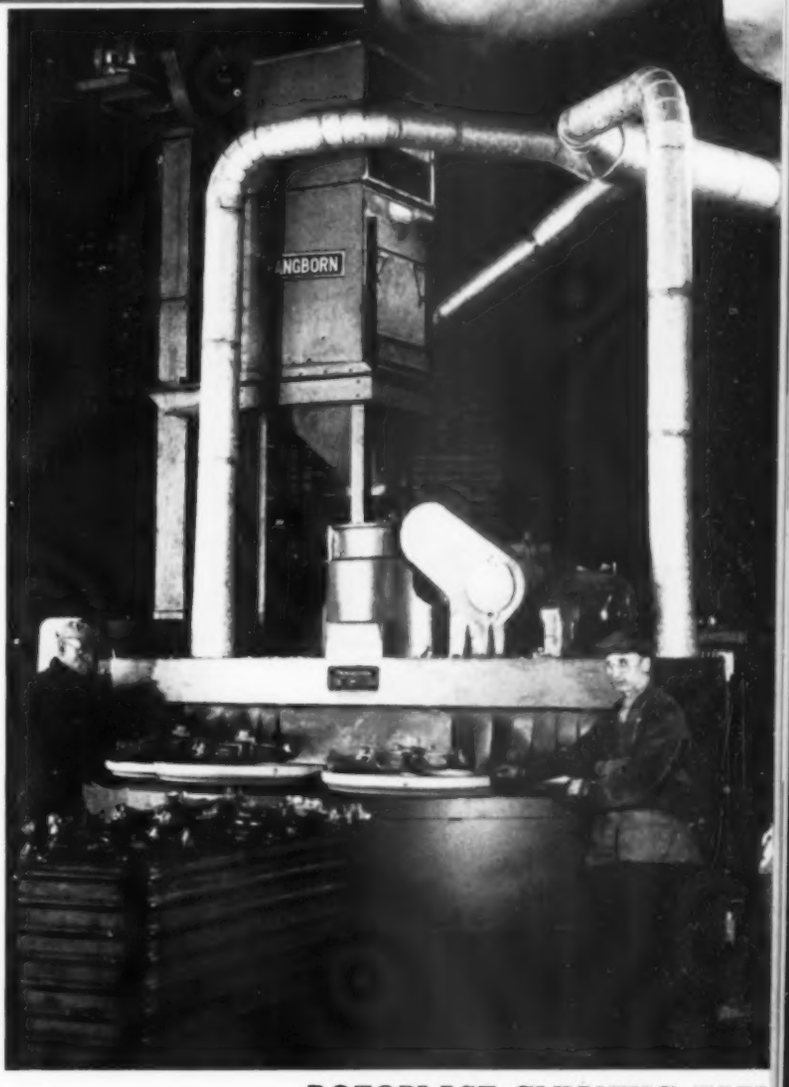
PANGBORN CORPORATION . . . . . .

for 1942

DO HIS PART WELL!

Here is how we all feel at Pangborn's. Every ounce of manpower, every measure of strength, every resource in this fine plant of ours is placed at the disposal of our great government. We shall work together, men and management, day and night, each with our shoulder to the wheel, cheerfully, that the absolute justice of Democracy's belief may prevail to a certain victorious end.

We are rightly proud that our equipment helps industry grow stronger by the hour. We are PROUD of our Land, our Country, and our brave fighting sons at the Front. We stand solid behind them. With all our hearts and to the limits of our endurance we pledge 100 per cent "THUMBS UP" mobilization for 1942!



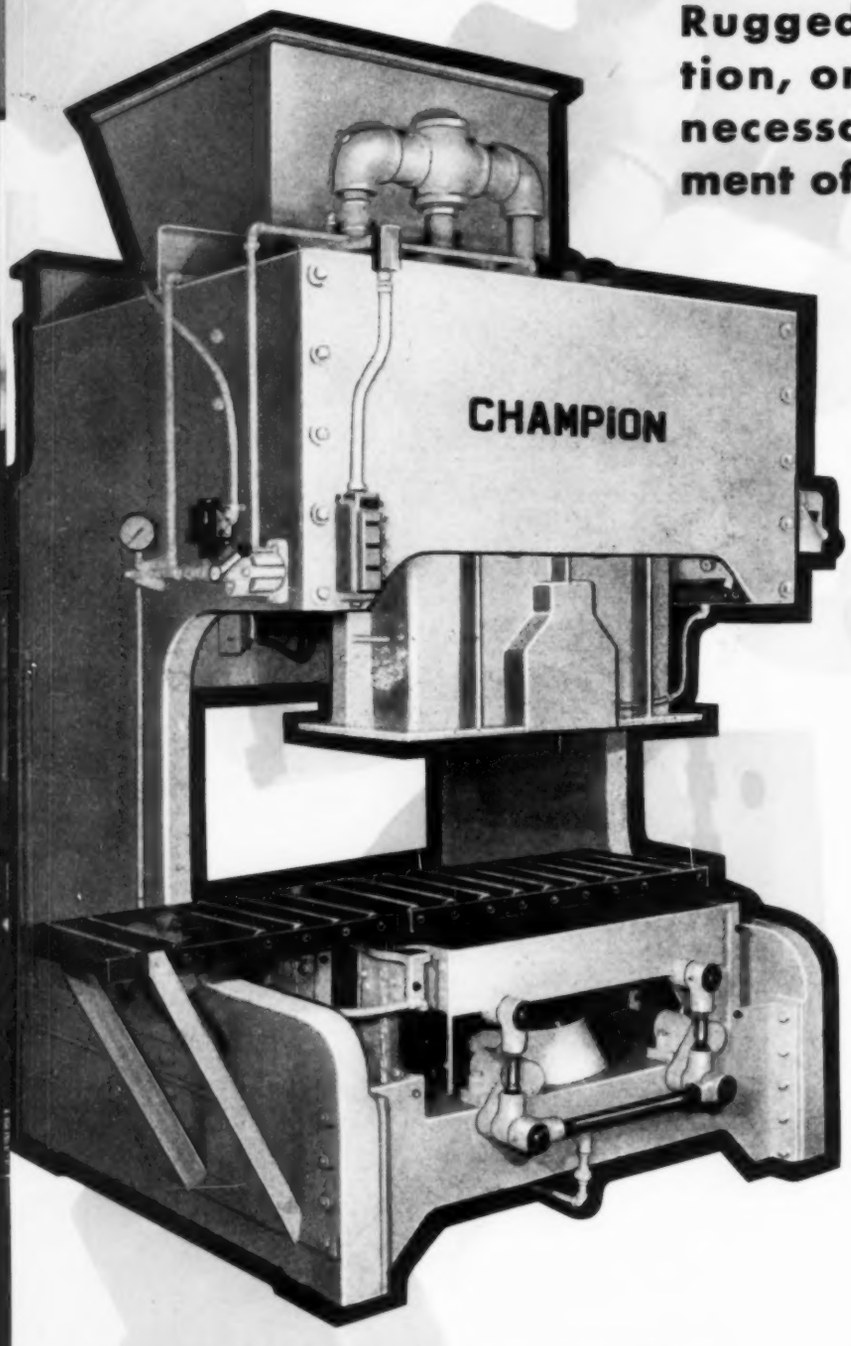
ROTOBLAST CLEANING TABL

CLEANING AND DUST CONTROL EQUIPMENT

BORN

HAGERSTOWN, MARYLAND

RELIABLE • *Champion Core Blowers*



Rugged cast steel frame construction, on all models, provides the necessary rigidity to insure alignment of core boxes and blow plates.

No. 400 SUPER BLOWER (left)

For fast and economical production of

BOMB cores—SHELL cores

CRANK CASE cores

BARREL cores

TRANSMISSION cores etc.

•

CONVENIENT CONTROLS

SIMPLE ADJUSTMENTS

•

Every detail of operation is 100% fool-proof.

MODEL 400 has Triple Blow Valve—Competitive tests prove Multiple Blow Valves superior on larger cores. Equipped with positive mechanically operated table raising unit which won't "give" when blow pressure is applied.

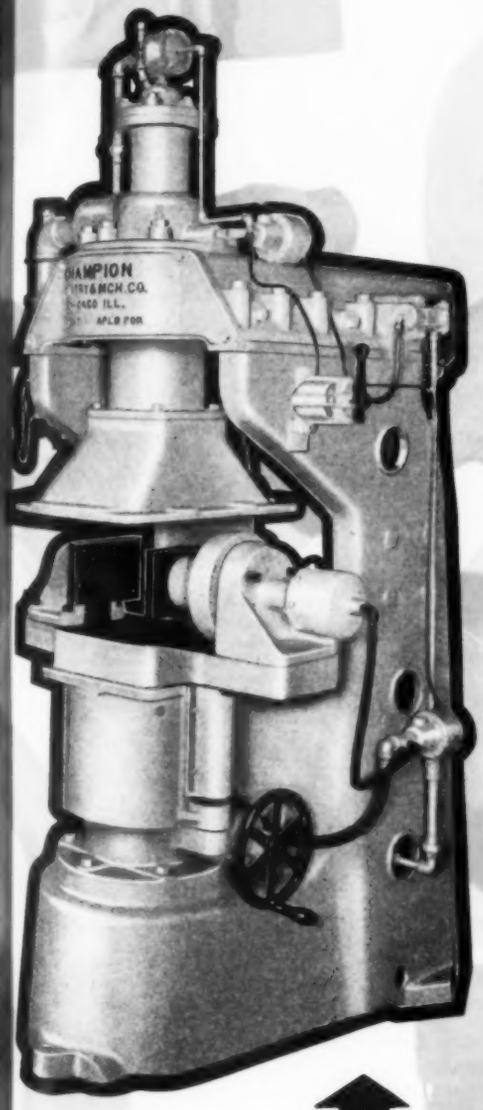
CHAMPION

FOUNDRY AND MACHINE CO. • 1316 WEST 21st ST. • CHICAGO, ILL.

Built up to a standard . . .

s won't let you down • **DEPENDABLE**

nstantaneous action of Blow Valve produces 25% more power —No pressure is dissipated due to "Air leakage", which is one reason CHAMPION CORE BLOWERS are successfully producing certain cores where others have failed.



MODEL CB-12

Only "CHAMPION" has the powerful Air Operated Hydraulic Clamp (Patent allowed) which prevents separation of split boxes when blowing cores.

CORES ARE TRUE TO BOX SIZE.

MODEL CB-8

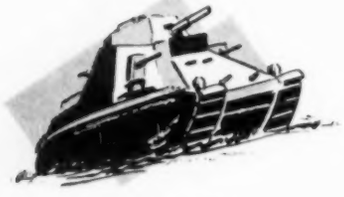
Reserve Air Tank is standard equipment on CB-8 and 12 Machines. Sand Hopper is furnished with all Blowers. Note the modern design—No obstructions to interfere with the convenient handling of core boxes.

CORE BLOWERS MOLDING MACHINES

not down to a price

SIMPSON *plus* "NATIONAL"

WILL HELP YOU SOLVE DEFENSE PRODUCTION PROBLEMS

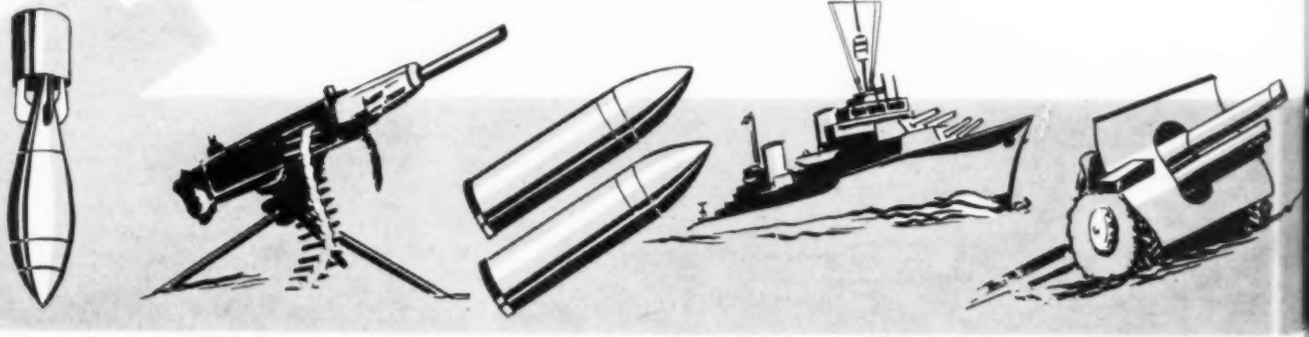


***ALUMINUM** and manganese parts for planes and engines . . . steel treads for tank crawlers . . . cast steel bombs . . . shell casings . . . machine gun and howitzer parts . . . these are but a few of the new defense production jobs which the foundry industry is now being called upon to do—but quick!*

In many cases, methods and materials needed to meet strict Army and Navy specifications must be somewhat different than those used before the national emergency. It is safe to assume that you, Mr. Foundryman, have already been confronted with defense production problems.

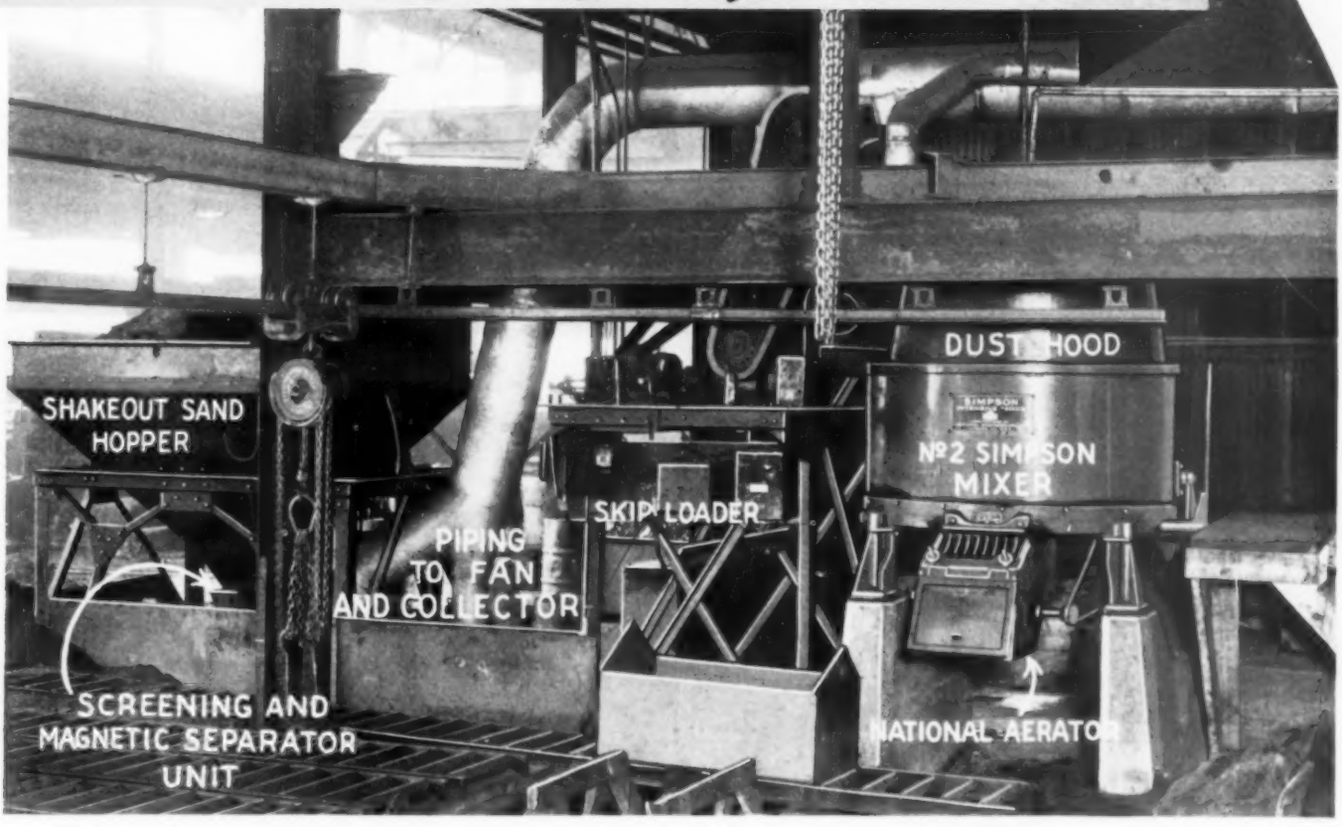
We'd like to pass on a tip . . . If it's a question of fast, correct blending of *any* type of sand for *any* type of foundry, get the facts on Simpson Intensive Mixers, plus National Auxiliary Equipment. Without question, this combination will give you the lowest cost per ton of good castings produced—plus improved quality of finished product.

Simpson Mixers are being supplied in ever-increasing numbers to help break up defense production bottlenecks. Let us suggest ways and means of helping you to step up capacity . . . write for further details.



INTENSIVE MIXERS

Auxiliary Equipment



• Illustrated above is a typical, complete sand conditioning, reclaiming and control unit handling high test grey iron and alloy work.

The Simpson Intensive Mixer, used with the National Screening and Magnetic Separator Unit, Bucket Loader and National Aerator, properly hooded for air exhaust, results in a compact, complete unit for foundries of moderate capacity. Such a unit enables these foundries to reclaim and recondition used sand that formerly was carted to the dump, to recondition their shakeout sands, provide facing sands or service particular floors making special work.

By means of thorough cleaning and screening of the sand, fines control, proper mulling and aeration of the sand for delivery to the molders, these units permit close control of sand conditions on an extremely economical basis.

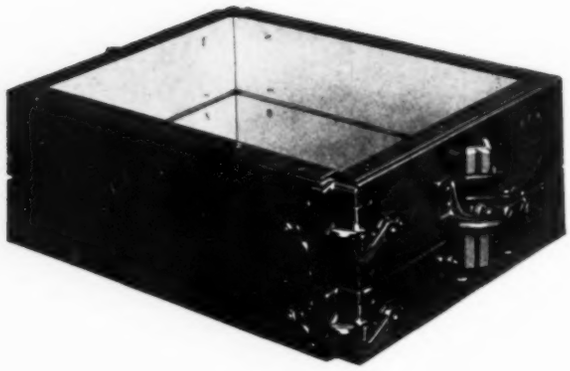
• This advertisement is the first in a series which will be devoted to the use of Simpson Mixers in defense production. Subsequent advertisements will feature individual examples of how specific production problems are being solved.

SIMPSON INTENSIVE MIXERS

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries:—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia



ADAMS CHERRY SNAP FLASK

Custom-built, any desired size, with straight sides or any desired taper. Wide-V, double-V or round pins—triple-locking snaps or lever latches. Trimmings fully adjustable to compensate for wear.

ADAMS CHERRY SLIP FLASK

A very convenient flask for machine or bench, made to your dimensions. Wide-V, double-V or round pins. Dependable and easily operated sand strip mechanism.

ADAMS CAST IRON JACKET

The patented construction of this jacket, involving a combination of horizontal and vertical ribs and machined corners, provides maximum rigidity with minimum weight. Any size, straight or tapered.

ADAMS STEEL JACKET

The strongest and most rigid jacket on the market, to effectively handle the most difficult jobs. Made in any desired size, straight or tapered.

THE ADAMS COMPANY

MOLDING MACHINES · FLASK

This is what
Adams Jolt Squeezers
will do for you!

They Will Reduce Production Costs. They are efficiently designed with a minimum number of working parts, and controls are accessible for quick handling.

They Will Assist in Reducing Losses. Close control of jolting and squeezing operations assures the production of uniform molds.

They Will Help to Maintain Uninterrupted Production. Simple design and durable construction provide insurance against production delays.

They Solve the Skilled Labor Shortage. Their operation has been so simplified that no special skill is required to operate them successfully.

Adams Jolt Squeezers are made in both Side Rod Type and Post Type, with 10" or 12" cylinder, stationary or portable. Same sizes available in Jolt-Squeeze-Pattern-Draw machines.

NY · DUBUQUE, IOWA · U.S.A.

EQUIPMENT Established 1883

YOU CAN FORGET THAT YOU HAVE A SCHNEIBLE!

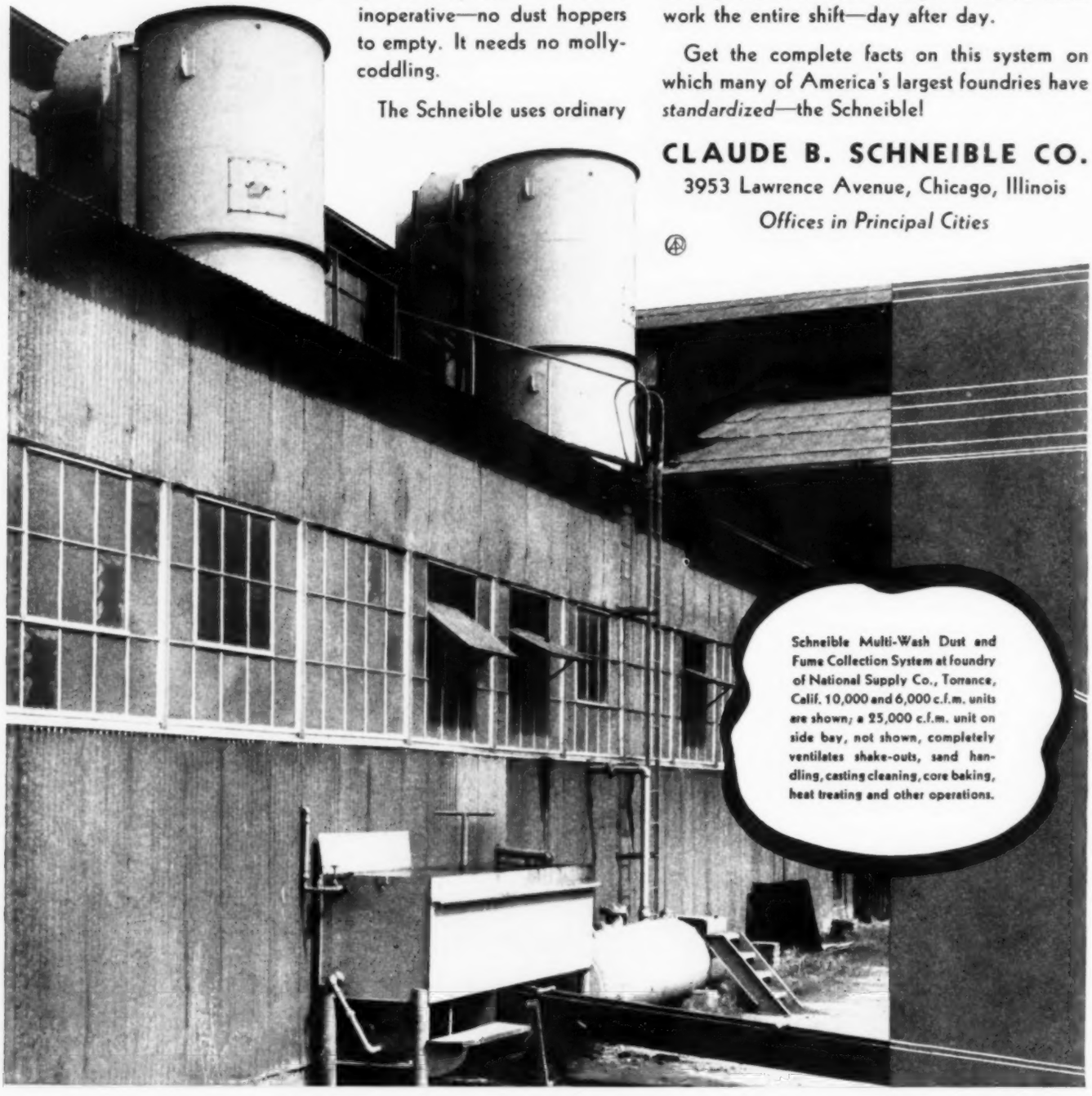
When you install a Schneible Multi-Wash System, your dust and fume collection worries are over. The Schneible has no bags, screens or filters to be shaken daily or replaced when they wear out—nothing to break, burn or become inoperative—no dust hoppers to empty. It needs no molly-coddling.

The Schneible uses ordinary water over and over again to actually wash dust and fumes out of the air. The collected matter, as sludge, flows to a dewatering tank (or waste), the sludge settles out and the clear water is recirculated.

Simple, isn't it? So simple it requires only the flick of a switch and the turn of a valve to start or stop and the man in charge is free for other work the entire shift—day after day.

Get the complete facts on this system on which many of America's largest foundries have *standardized*—the Schneible!

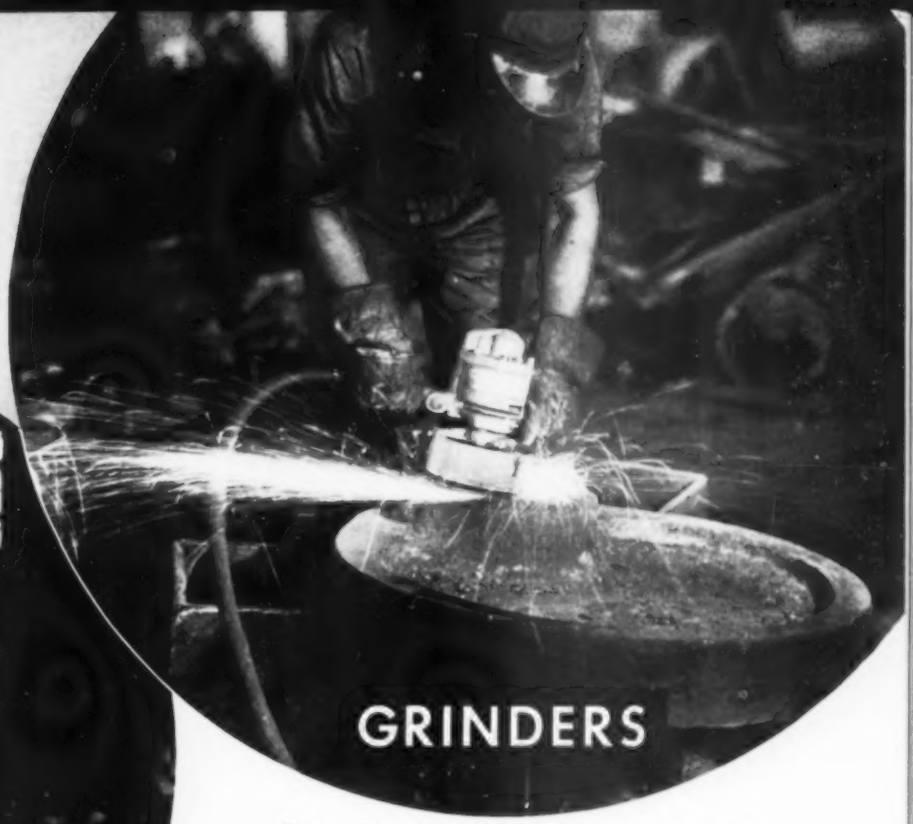
CLAUDE B. SCHNEIBLE CO.
3953 Lawrence Avenue, Chicago, Illinois
Offices in Principal Cities



Schneible Multi-Wash Dust and Fume Collection System at foundry of National Supply Co., Torrance, Calif. 10,000 and 6,000 c.f.m. units are shown; a 25,000 c.f.m. unit on side bay, not shown, completely ventilates shake-outs, sand handling, casting cleaning, core baking, heat treating and other operations.

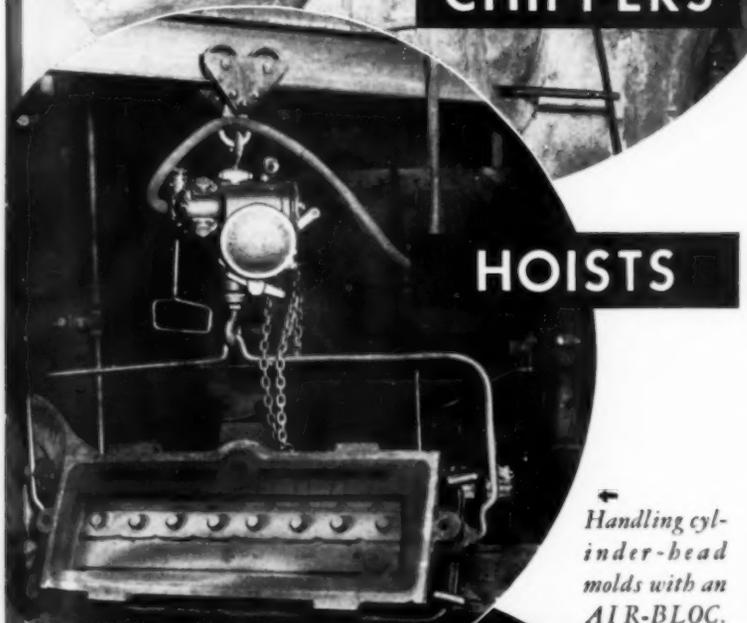
SCHNEIBLE

I-R AIR TOOLS FOR THE FOUNDRY



Smoothing off hub on steel gear casting with a Size 4F "Multi-Vane" Surface Grinder.

Cleaning a large casting with Size 300 Chippers.



Handling cylinder-head molds with an AIR-BLOC.

A *Saving* In Each Operation

"MULTI-VANE" GRINDERS . . . These powerful, efficient and easily handled tools are equipped with speed governors, automatic lubricators, and two combination radial and thrust ball bearings. Sizes and speeds for grinding wheels from 1½" to 8" diameter.

CHIPPING HAMMERS . . . Well known in foundries and steel mills everywhere, I-R chippers are built with the famous "flapper-valve" which is self-seating and practically indestructible. Operators like their powerful action and easy holding qualities.

"SAFETY-FIRST" AIR HOISTS . . . Ideal for foundry service. Protection from the effects of heat and dust is assured. Because they are free from vibration and have nicely graduated control, they are especially fitted for delicate work such as drawing patterns or lowering a cope onto a drag.

The AIR-BLOC—the latest addition to the hoist line—is a lightweight unit for handling loads up to 700 pounds. It has the same accurate control and safety features of the larger hoists.

SAND RAMMERS . . . Tools that are built especially for foundry service. For years they have been standard equipment in most foundries. The self-seating flapper-valve will easily pass sand and dirt. Operators are assured of a powerful action combined with easy holding qualities.

Size 14 Bench Rammers at work in a large foundry.

Ingersoll-Rand

11 BROADWAY, NEW YORK CITY

8-116

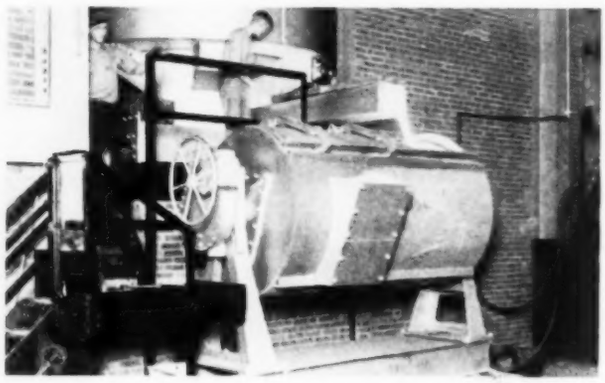
Branches or Distributors in other principal cities the world over.

Ready to ship.. NOW!

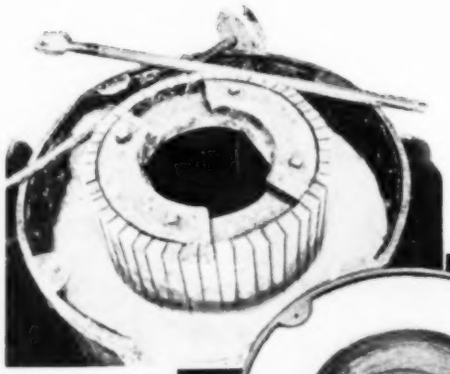
SPECIAL REFRACTORIES FOR FOUNDRIES

EASY TO WORK ✓
LONG LIVED ✓
LOW NET COST ✓
OUTSTANDING ENGINEERING PROPERTIES ✓

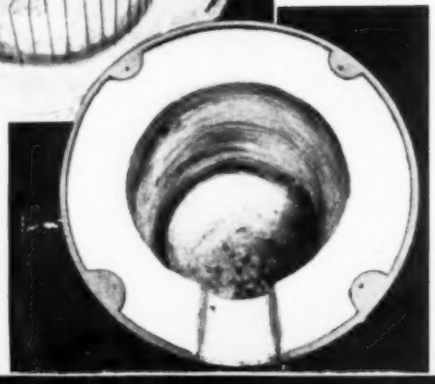
Increase Capacity and Improve Operation



(ABOVE) 6 ton mixer ladle lined with Super Ramtite Cover lined with Fractocrete



(BELOW) Special Super Ramtite is recommended for brass and bronze melting furnaces

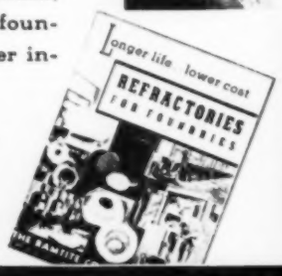


Bulletin Ready to Mail Now

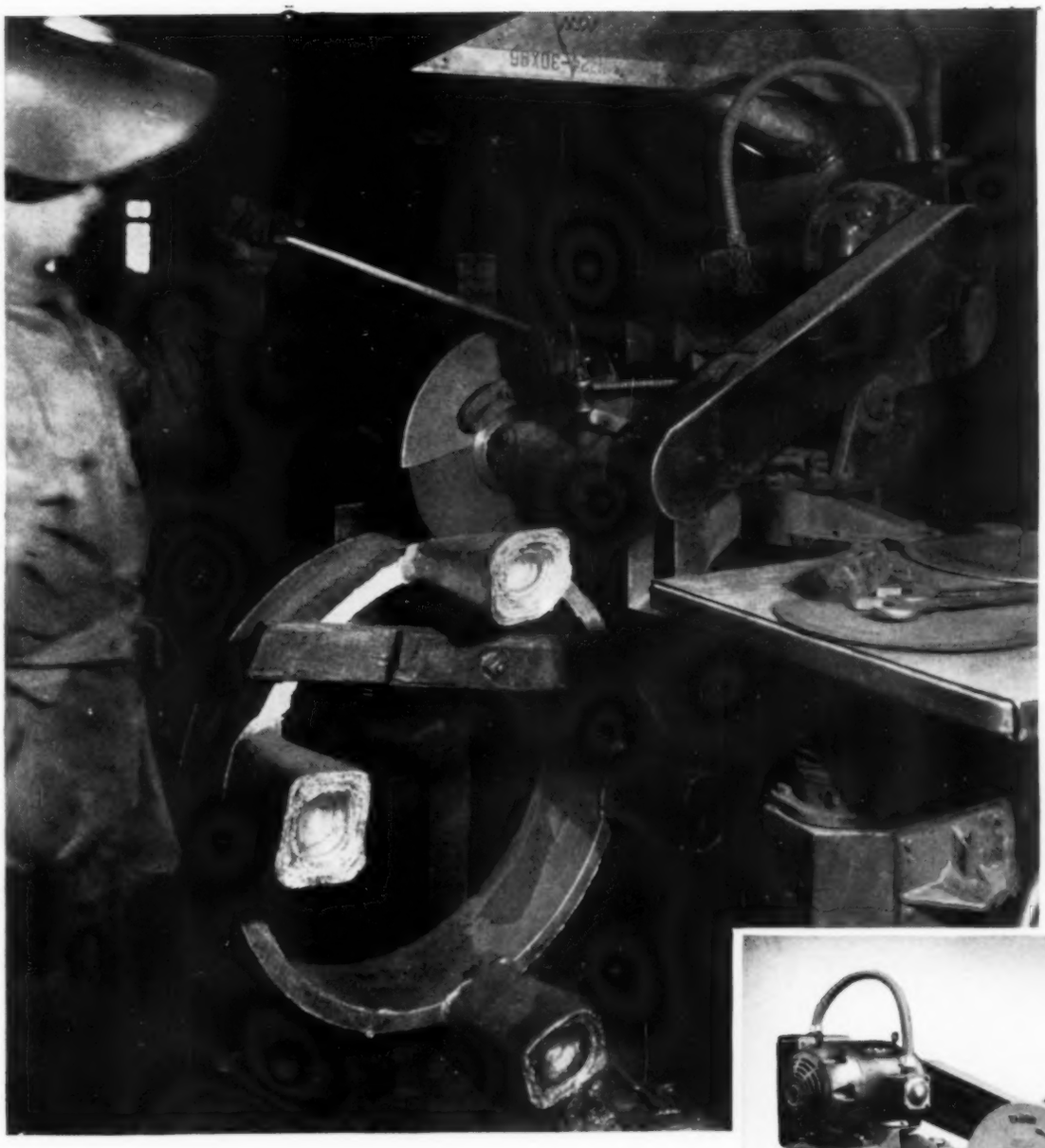
TODAY our special refractories are being used with marked success in gray iron, steel, malleable and non-ferrous foundries . . . because of the eminent suitability of their exceptional combination of engineering characteristics.

The bulletin illustrated below describes each of these products in detail; outlines their various applications in aluminum, brass, gray iron, malleable and steel foundries and gives instructions for proper installation.

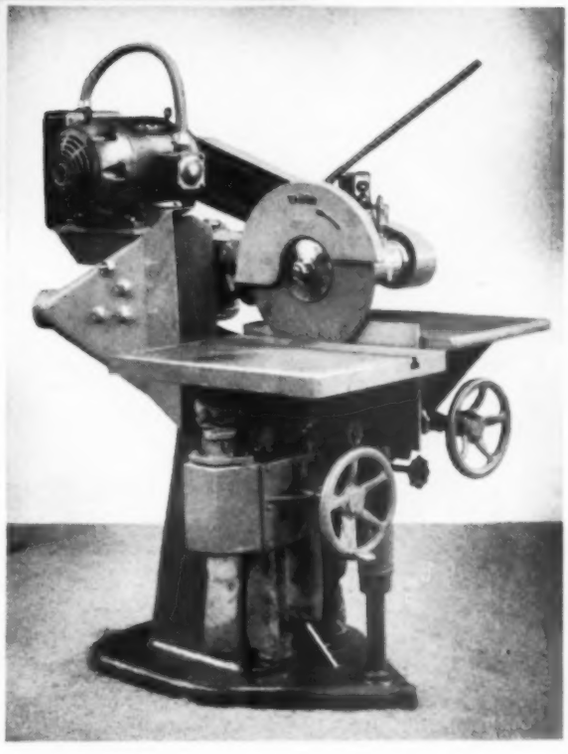
SEND NOW FOR A COPY WITHOUT OBLIGATION



THE RAMTITE CO. 1803 So. Rockwell St.
DIVISION OF THE S. OBERMAYER CO. CHICAGO, ILL.



TABOR



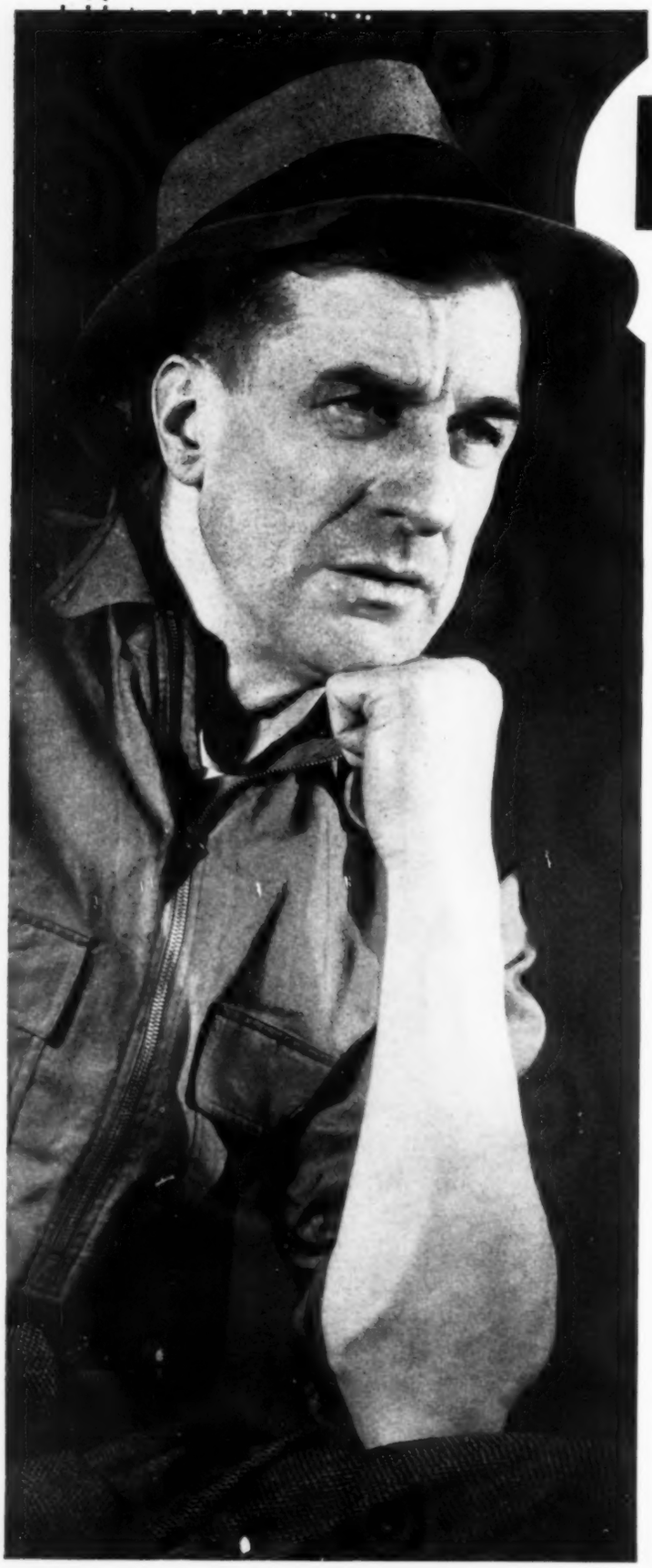
THIS TABOR-BRASIVE CUT-OFF MACHINE *REACHES* FOR THE BIG ONES . . .

Cutting gates and risers from castings standing 45 inches from the foundry floor is easy for this Cut-Off Machine. The head swings off the table to the work. Cuts are made so clean and so close to the casting that snagging and finish grinding is reduced to a minimum—often entirely eliminated.

Tabor-Brasive Cut-Off Machines are built in a complete range of sizes and types, and can also be furnished to meet special requirements. Write for information, giving us details of your cutting problems.

THE TABOR MANUFACTURING COMPANY
6225 Tacony Street • Philadelphia • Pennsylvania

Representatives: *Los Angeles, Calif.,* Snyder Foundry and Supply Co.; *Oakland, Calif.,* Pacific Graphite Co.; *Seattle, Wash.,* Carl F. Miller & Co.



HOW FAR must you plan ahead?

What are your plans for 1942 . . . for 1943? How well will the facilities of your foundry dove-tail with Defense requirements? American industry will be called upon to produce vastly larger amounts of defense materials right now and during the next several years. How well you play your part will depend upon how well you meet this challenge to American industrial ingenuity.

If producing MORE CASTINGS means taxing the facilities of your present molding department it will pay you to check recent successful results Herman engineers have achieved in many foundries throughout the Country with the installation of modern Herman Molding Machines.

Herman engineers have specialized for the past forty years solely in the design of better molding equipment. Their success is attested by the large roster of outstanding foundries using Herman Machines. Records of increasing mold production 400 to 500 percent over old methods are not uncommon. Production time and costs are similarly slashed.

Check the facilities of your molding department today. Get all the facts on Herman Molding Machines. We can help you help Defense!

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

SLY DUST CONTROL Is Helping Foundries Get Top Production

★Good working conditions for employees is one of the most important considerations today in meeting the demands for production and more production.

SLY DUST CONTROL is inexpensive insurance against health hazards—against lost time. It enables men to work to better advantage—to accomplish more. Sly Cloth Filters positively collect all the dust—even the very finest—from blast rooms, blast mills, tumbling mills, grinders and other dust centers.

Users find in Sly Dust Filters certain exclusive advantages:

(1) Greater filtering capacity because of more filter cloth.

(2) Less maintenance due to simpler shaker mechanism.

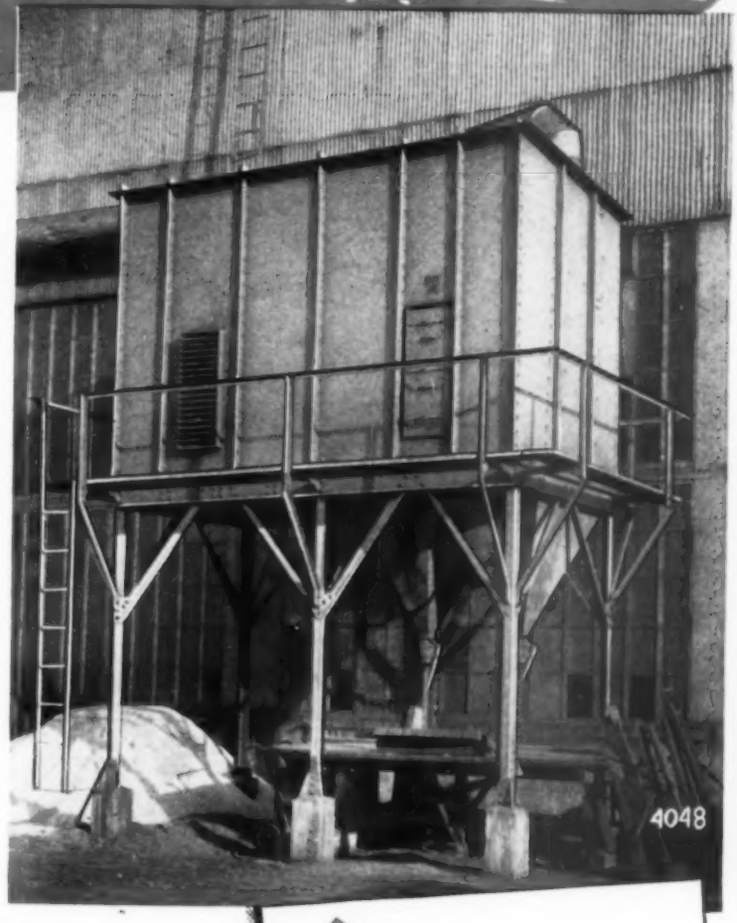
(3) Bag replacement easily handled.

(4) Complete dust removal with minimum resistance to air flow because of filter bags under tension.

(5) Automatic control (any degree).

These features help enormously in efficient operation.

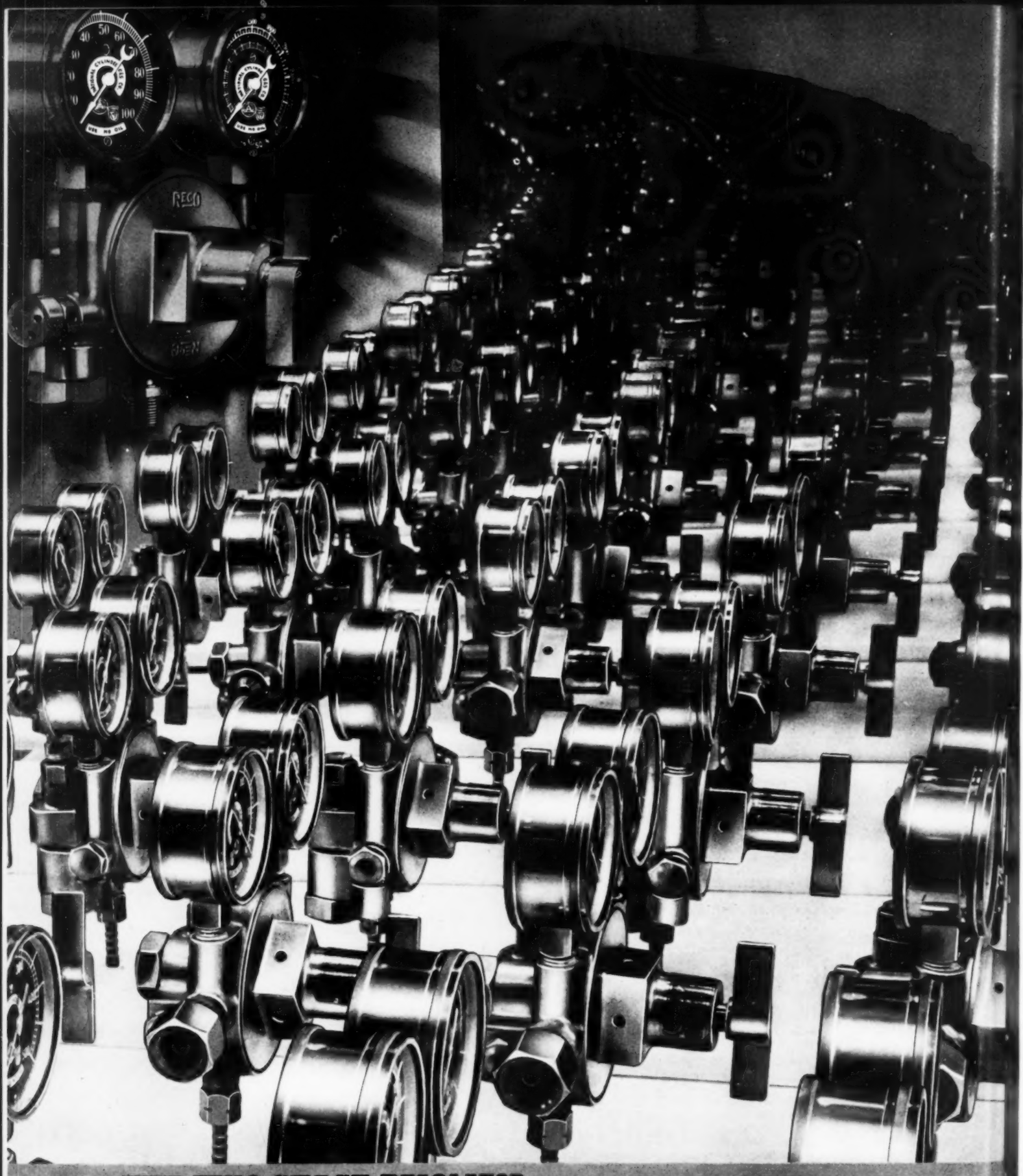
Write us fully. We will analyze your situation and tell you exactly what can be accomplished. Sly Dust Control pays for itself.



SLY DUST CONTROL INSTALLATION FOR A PROMINENT FOUNDRY.

THE W. W. SLY MANUFACTURING CO.
Branch Offices in Principal Cities **4753 Train Ave., Cleveland, O.**

TUMBLING MILLS **SLY** **BLAST ROOM EQUIPMENT**
INDUSTRIAL DUST CONTROL



THE TWO-STAGE REGOLATOR... combines a nozzle type 1st stage with a stem type 2nd stage to produce a non-fluctuating welding flame.

Write for circular fully describing this and other RegOlator features.

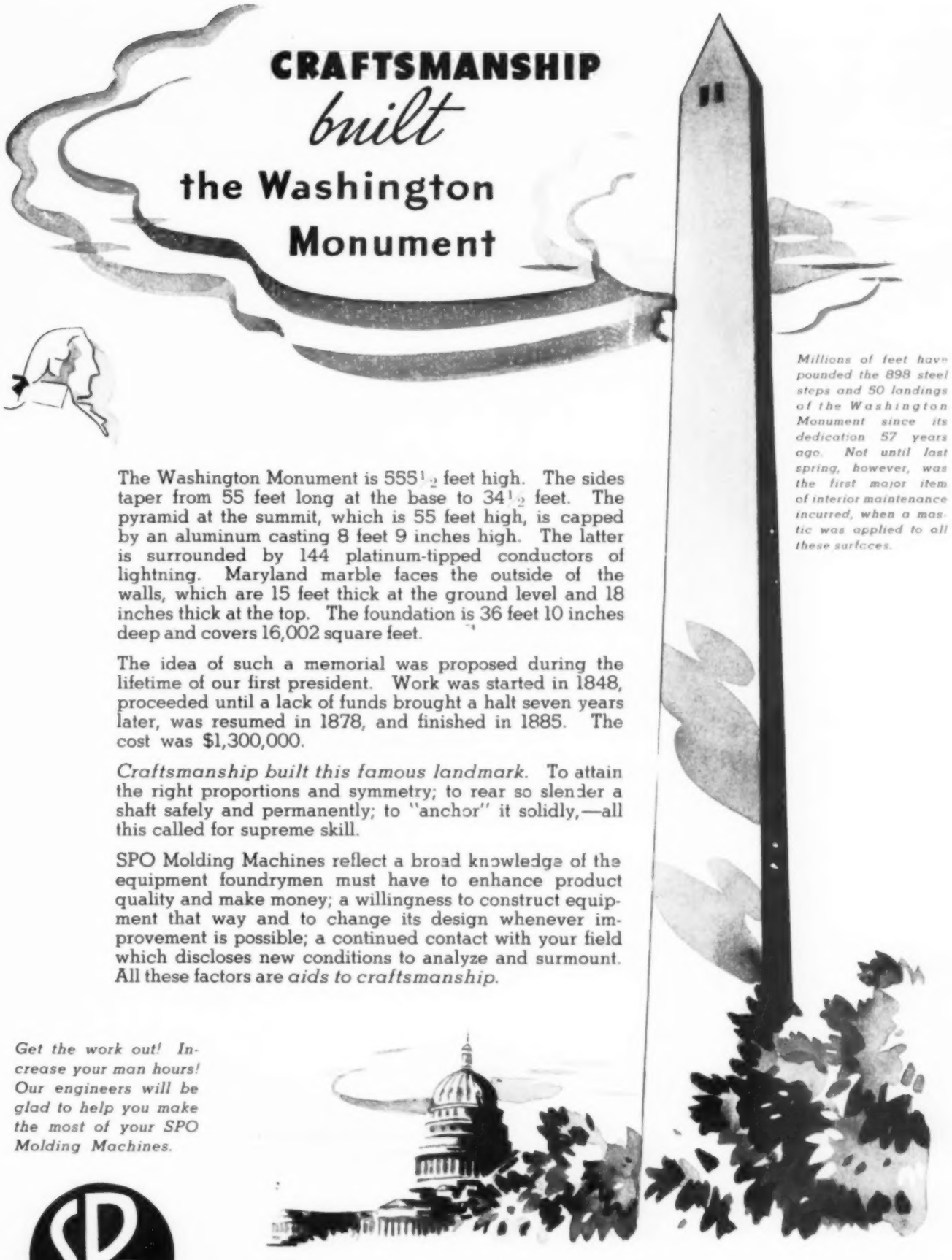
REGO . . . pioneer equipment for using and controlling high pressure gases . . . distributed by

NATIONAL CYLINDER GAS COMPANY

205 W. Wacker Drive — Chicago, Illinois

Offices in Principal Cities

CRAFTSMANSHIP *built* the Washington Monument



Millions of feet have pounded the 898 steel steps and 50 landings of the Washington Monument since its dedication 57 years ago. Not until last spring, however, was the first major item of interior maintenance incurred, when a mastic was applied to all these surfaces.

The Washington Monument is 555½ feet high. The sides taper from 55 feet long at the base to 34½ feet. The pyramid at the summit, which is 55 feet high, is capped by an aluminum casting 8 feet 9 inches high. The latter is surrounded by 144 platinum-tipped conductors of lightning. Maryland marble faces the outside of the walls, which are 15 feet thick at the ground level and 18 inches thick at the top. The foundation is 36 feet 10 inches deep and covers 16,002 square feet.

The idea of such a memorial was proposed during the lifetime of our first president. Work was started in 1848, proceeded until a lack of funds brought a halt seven years later, was resumed in 1878, and finished in 1885. The cost was $1,300,000.

Craftsmanship built this famous landmark. To attain the right proportions and symmetry; to rear so slender a shaft safely and permanently; to "anchor" it solidly,—all this called for supreme skill.

SPO Molding Machines reflect a broad knowledge of the equipment foundrymen must have to enhance product quality and make money; a willingness to construct equipment that way and to change its design whenever improvement is possible; a continued contact with your field which discloses new conditions to analyze and surmount. All these factors are *aids to craftsmanship.*

Get the work out! Increase your man hours! Our engineers will be glad to help you make the most of your SPO Molding Machines.

SPO

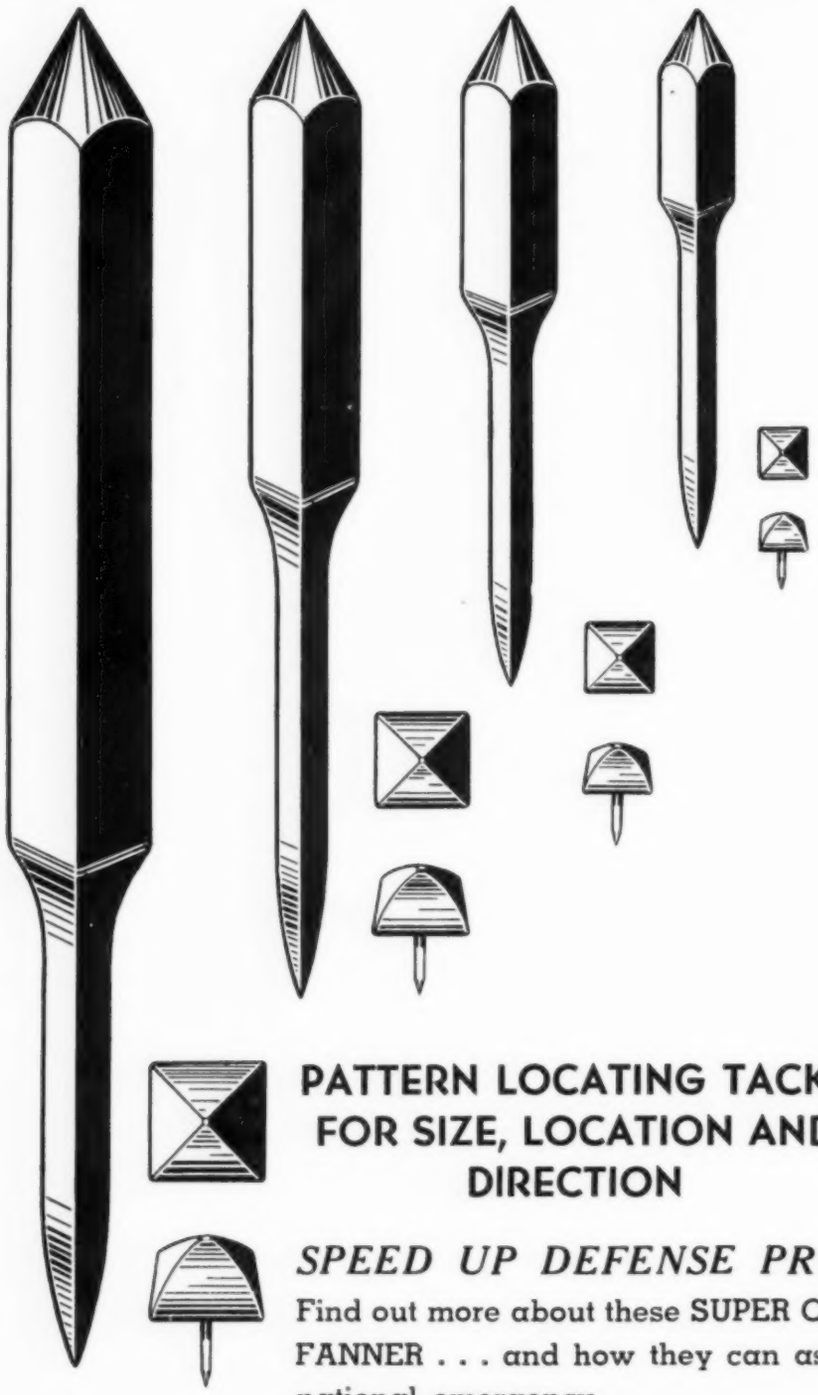
INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE • • CLEVELAND, OHIO

SUPER CHILLS

PATENTED



PATTERN LOCATING TACKS FOR SIZE, LOCATION AND DIRECTION

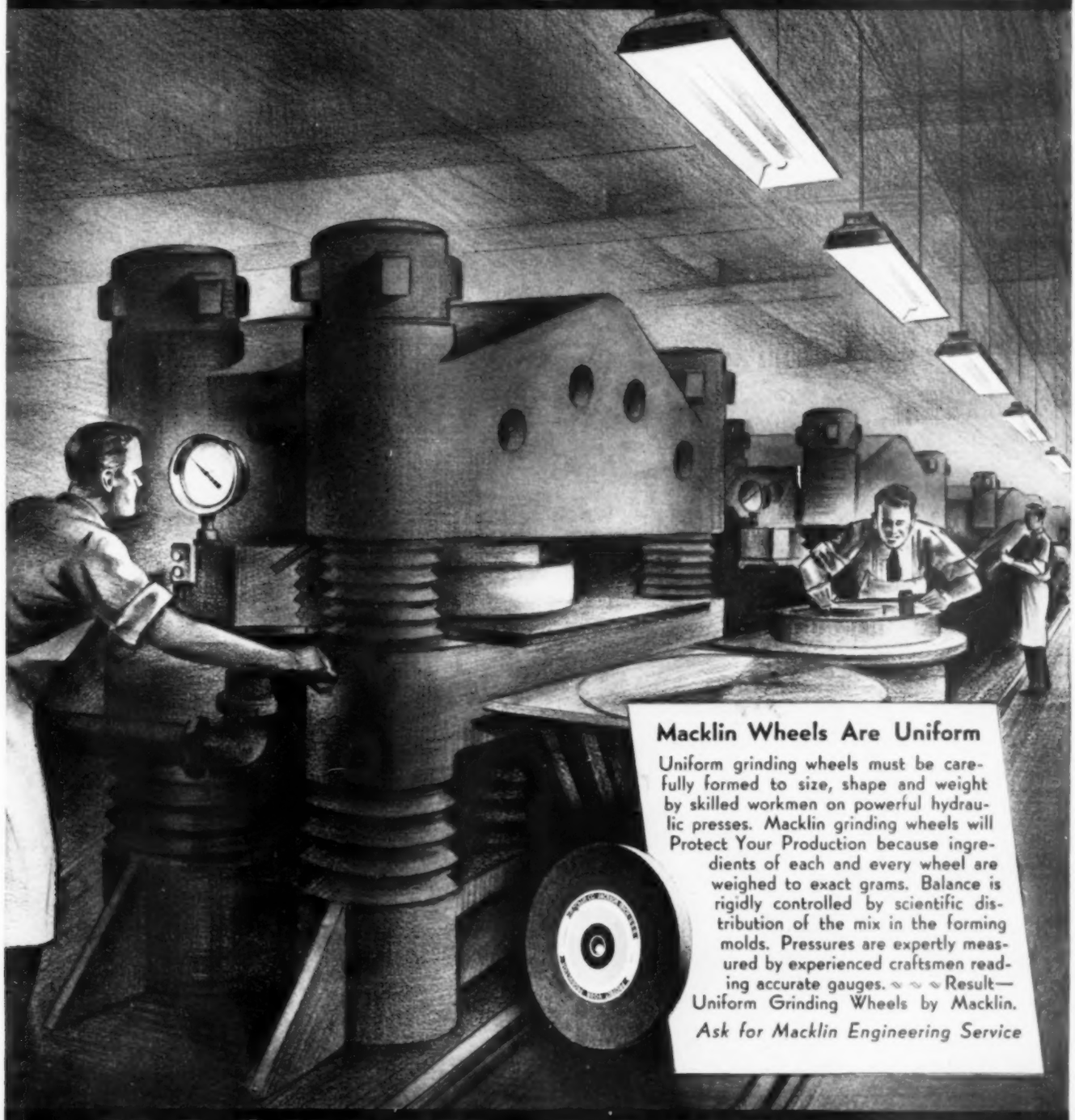
SPEED UP DEFENSE PRODUCTION

Find out more about these SUPER CHILLS made by FANNER . . . and how they can assist you in this national emergency.

THE FANNER MANUFACTURING CO.

BROOKSIDE PARK — CLEVELAND, OHIO

MACKLIN
GRINDING WHEELS



Macklin Wheels Are Uniform

Uniform grinding wheels must be carefully formed to size, shape and weight by skilled workmen on powerful hydraulic presses. Macklin grinding wheels will Protect Your Production because ingredients of each and every wheel are weighed to exact grams. Balance is rigidly controlled by scientific distribution of the mix in the forming molds. Pressures are expertly measured by experienced craftsmen reading accurate gauges. ∿ ∿ ∿ Result—Uniform Grinding Wheels by Macklin.

Ask for Macklin Engineering Service

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

Night and DAY for 1942

WE PLEDGE the entire resources, facilities and man power of our organization, twenty-four hours of every day to the production of more grinding wheels of the same high quality, in our endeavor to cooperate to the very fullest with all of America's defense plans. This pledge we make sincerely and most wholeheartedly.

BAY STATE
ABRASIVE PRODUCTS CO.
WESTBORO, MASSACHUSETTS

PRODUCTION more than DOUBLED with MAEHLER OVENS

Paper Prepared for

MEEHANITE INSTITUTE MEETING

gives full account of outstanding economies at ATLAS FOUNDRY, DETROIT

PRODUCTION:

1. Increased from 182 tons per week, including Sundays, to 396 tons per week regular time. Four times number of molds as formerly.

2. Now bake large molds thoroughly which formerly could only be torch dried.

3. Maehler airheat bakes large and thin sections of same mold and core without burning the light sections.

4. Can load molds with only 4 inch space between them.

HEAT LOSSES IN RELOADING

In transferring individual racks when pushing the core output, only 50 degrees oven heat loss is experienced, and temperature returns to normal in 4 minutes.

BAKING CAPACITY EXAMPLE

2 cores 29 x 72 x 30—4016 lbs.
4 cores 33 x 72 x 30—4548 lbs. 9 hrs.
(Total sand weight 26,224 lbs.)

PERFECT EXAMPLE 5 HR. BAKE (CORES)

1—50"x10'2"x72" Weight sand—22,700 lbs.
2—56"x7'5"x8½" Weight steel—16,600 lbs.
1—78"x11'0"x12" Temperature—450°F
2—54"x7'6"x12" Arrived at temperature in 90 min.

ECONOMY

Above 5 hr. load, gas cost $ .84 per hour. Cost of fuel for baking equals $ .375 per ton.

PERFECTION

Baked core color so closely approximates green core that operators mark racks to avoid error in loading.

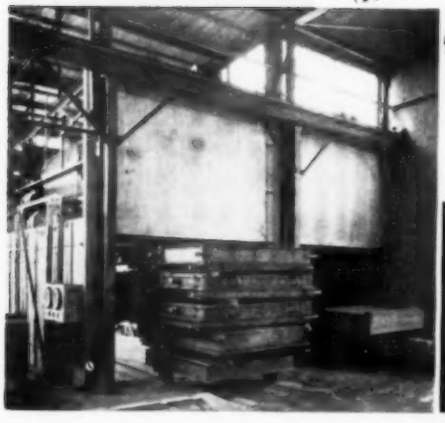
DESCRIPTION OF MAEHLER OVENS

2 compartments each 12'0" wide x 9'0" high x 18'0" deep. Car and rack combination, electric lift doors both ends of 1 section, one end second section.

Two #4-35-11000 CFM airheaters driven by 7½ HP motors. Leeds and Northrup Mixcromax controllers.

Wheelco Flametrol safety equipment.

Automatic time and temperature control of heat rise and shut-off.



It's results like these that are bringing orders and re-orders for Maehler Core Ovens. Join the parade for lower costs, greater production and better cores.

Ask Maehler engineers to figure the ovens for your plant. Write today and ask for NEW CORE OVEN BULLETIN!

THE PAUL MAEHLER COMPANY
2200 W. Lake St., Chicago, Ill.

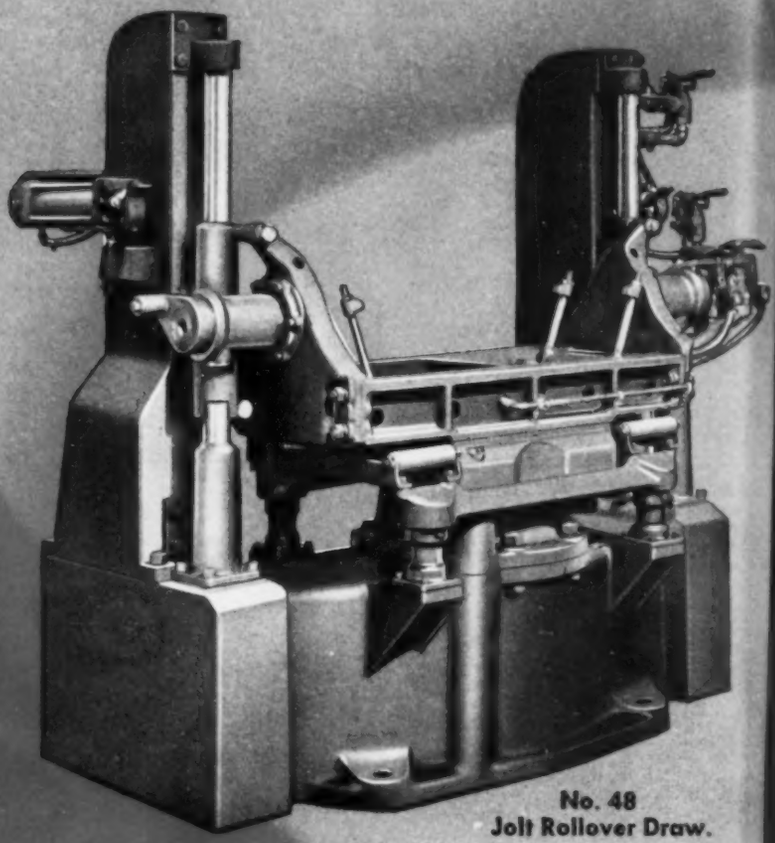
MAEHLER Core Ovens

Now - A Complete Line of

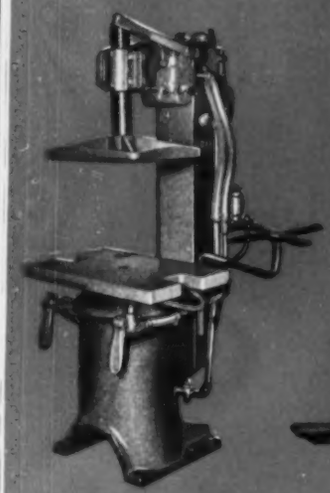
In the spotlight are two new Milwaukee Molders for the jobbing foundries. These are built with the same ruggedness and precision which made Milwaukee Molders the pass-word on production lines. Today, jobbing foundries are being taxed to the limit of their capacities. Therefore they require machines to produce accurate molds with minimum maintenance.

No. 103 Jolt Squeezer.
10" Squeeze Piston.
17" x 21" Table.

No. 104 Jolt Squeezer.
10" Squeeze Piston.
17" x 21" Table.

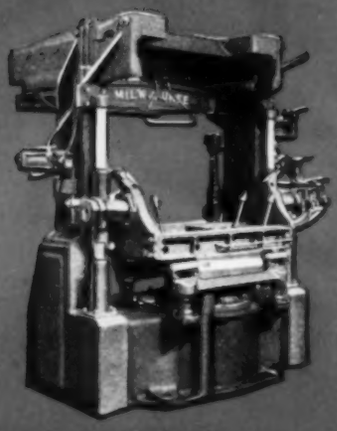


No. 48
Jolt Rollover Draw.
Power Rollover, Hydraulic Levelling, Mold Roll-out.
Made in Several Sizes.

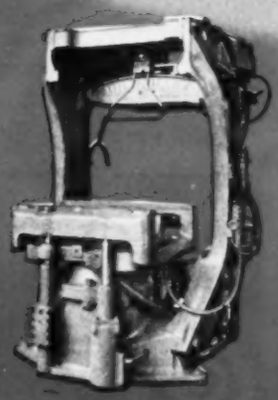


No. 123 Jolt Squeezer.
12" Squeeze Piston.
17" x 26" Table.

No. 124 Jolt Squeezer.
12" Squeeze Piston.
17" x 26" Table.



No. 217 Jolt Squeeze Rollover Draw.
Power Rollover, Hydraulic Levelling, Mold Roll-out.
Made in Several Sizes.



No. 214 Jolt Squeeze Strip.
Equipped with Mold Lift-off.
Made in Several Sizes.

MILWAUKEE

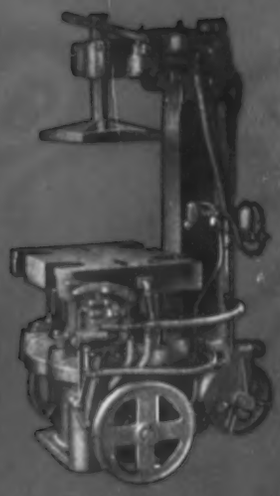
MANUFACTURERS OF MOLDING MACHINES AND BRIQUETTING PRESSES

Milwaukee Molders

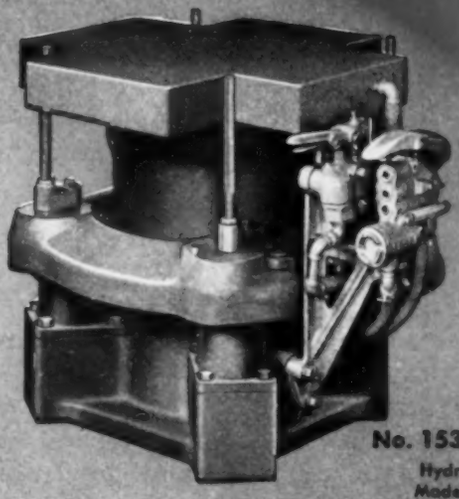
With the addition of these new types of machines, we now offer a complete line of Milwaukee-built Molders for both jobbing and production foundries.

These new Milwaukee Molding Machines are built up of mechanisms which have been thoroughly proved. The No. 48 was developed from the No. 217 and the No. 1536 PL from the No. 125. In each case the squeezing mechanism has been eliminated. Both the No. 217 and No. 125 machines have been in operation for several years under the severest conditions.

No. 125 Jolt Squeeze Pin Strip.
12" Squeeze Piston.
8" Draw.
Made in Other Sizes.

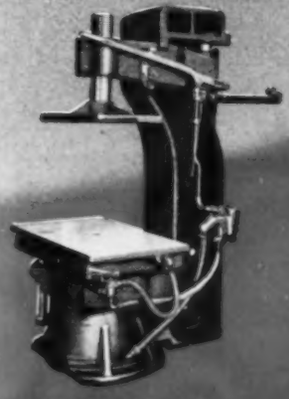


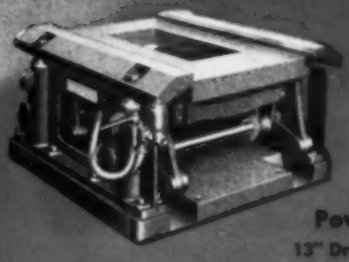
No. 126 Jolt Squeeze Pin Strip.
12" Squeeze Piston.
8" Draw.
Made in Other Sizes.



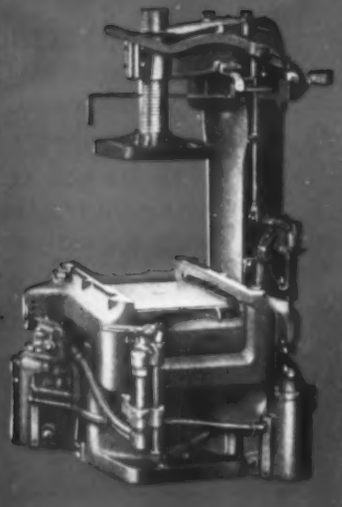
No. 1536 PL Jolt Pin Lift.
Hydraulic Slow Draw.
Made in Several Sizes.

Plain Jolt.
Made in All Sizes.





Power Draw.
13" Draw. 27" Height.
Made in Several Sizes.



No. 163 Jolt Squeeze Strip.
16" Squeeze Piston.
16" Opening.
Made in Other Sizes.

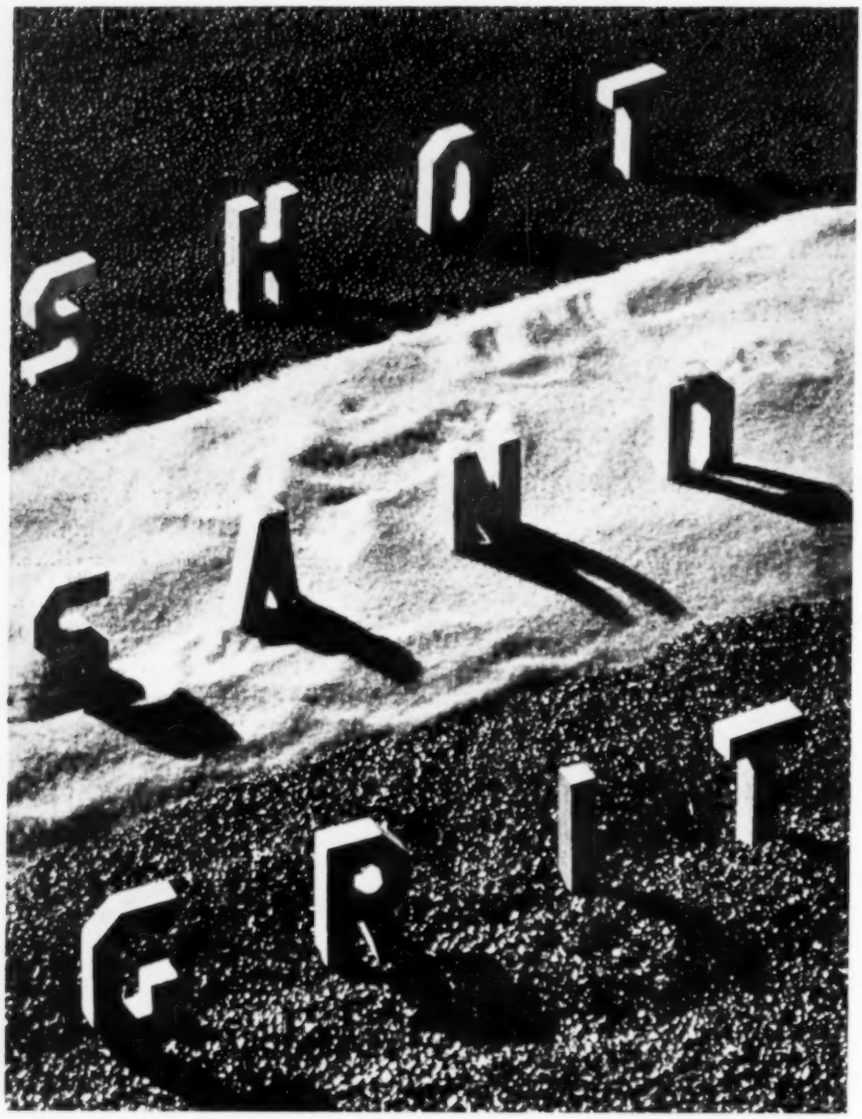
No. 181 Jolt Squeezer.
18" Squeeze Piston.
24" x 36" Table.
Made in Other Sizes.

Core Grinder.
70" Table. 30" Wheel.

Foundry Equipment Co.

3238 WEST PIERCE STREET • MILWAUKEE, WISCONSIN, U.S.A.

Great Lakes Abrasives



CLEANING COSTS are reduced — finish is improved — by the correct use of the proper abrasive, with equipment adjusted to the abrasive and to the character of the work.

Great Lakes blasting materials include both mineral and metallic abrasives, carefully selected, processed and graded.

There's a Great Lakes Abrasive for every metal cleaning need.

SAND BLASTING ENGINEERING SERVICE . . . inaugurated by Great Lakes years ago has effected tremendous savings in power and abrasive by foundries everywhere.

We invite you to avail yourselves of this service by having your blasting operations checked and necessary adjustments made by us at regular intervals.

Great Lakes Foundry Sand Co.

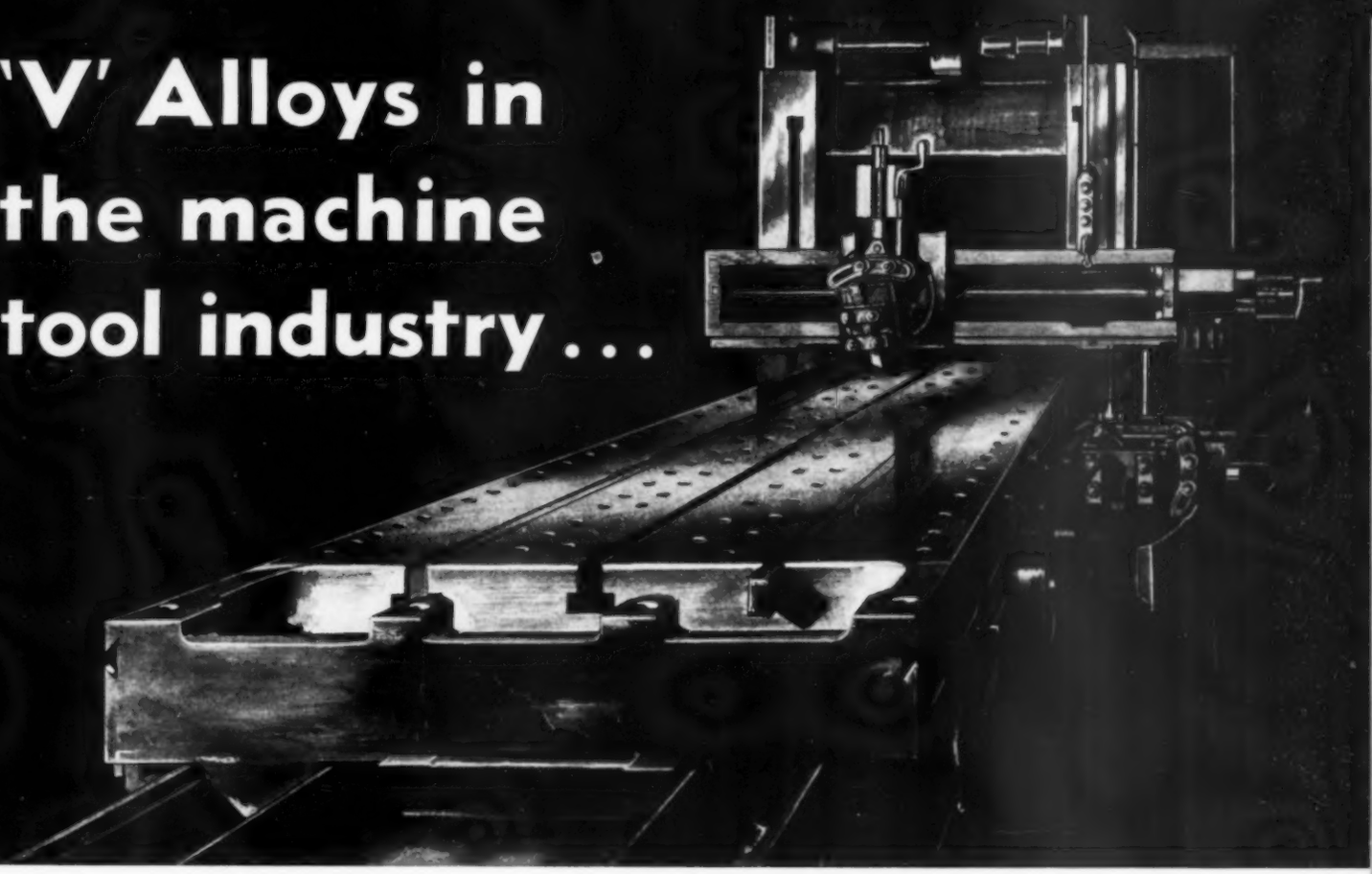
BUY GREAT LAKES!

United Artists Bldg. Detroit, Michigan

Miners—Processors—Foundry, Metallurgical and Sand Blast Service

Stoody Borium Nozzles
FOR ECONOMY'S SAKE

'V' Alloys in the machine tool industry...



Two unusual requirements of gray iron for machine tools:

- Uniform properties over a wide range of section;
- Wear resistance in heavy section.

Both of these requirements demand structure control — to develop balanced properties, uniformity, density, and at the same time, machinability. To get this structure control, some form of treatment is required which causes cast iron to be relatively insensitive to cooling rate.

V-5 and V-7 Alloys were developed for the specific purpose of harnessing this usually elusive property. These alloys reduce and stabilize chill depth and, by eliminating chilled edges, improve machinability. At the same time, they improve physicals by producing a denser, harder iron in heavy slow-cooling sections.

For example, an iron of T. C. 3.27%, Si 1.39%, Mn 0.84%, P 0.20%, S 0.06% gave the following results:

	Plain	Treated with 1% V-5
Tensile Strength	38,000 p.s.i.	41,500 p.s.i.
Transverse Strength	2,600 p.s.i.	2,960 p.s.i.
Deflection	.28"	.32"
B. H. N. (Center of bar)	217	227
Chill Depth	.750"	.400"

Structure in the plain iron: eutectiform graphite, cellular.
Structure in the treated iron: random graphite, plus pearlite.

V-Foundry Alloys are further remarkable in that they combine alloying with processing. Excess additions over a considerable range do not upset the balance established by the processing minimum, but effect only a true alloy-improvement in physical properties.

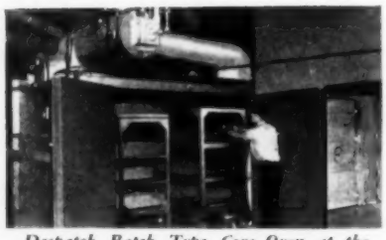
VANADIUM

CORPORATION OF AMERICA · NEW YORK, N. Y.

FERRO-ALLOYS

IMPORTANT FOUNDRY PROBLEMS ANSWERED BY DESPATCH ENGINEERING!

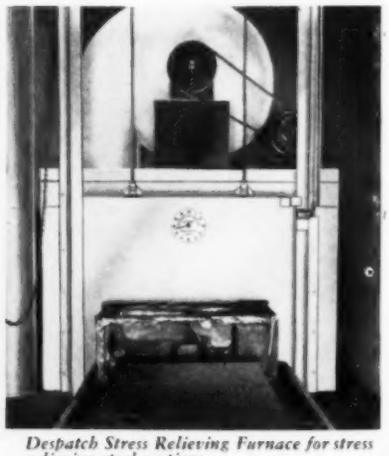
- CORE BAKING
- MOLD DRYING
- SOLUTION HEAT TREATING
- STRESS RELIEVING, AGING



Despatch Batch Type Core Oven at the Universal Foundry Company, Oshkosh, Wisconsin.

Despatch Car Type Mold Oven with heavy duty electrically operated lift doors—official U. S. Navy photograph.

Despatch Pot Type Furnaces with quick quench tank for solution heat treatment at Aluminum Industries, Inc., Cincinnati, O.



Despatch Stress Relieving Furnace for stress relieving steel castings.

Exacting specifications presented to the foundries these days offer plenty of complex problems. Thousands of ferrous and non-ferrous metal formulae required accurate control of heat in all foundry processes to assure the quality of castings necessary—the speed required—without costly rejects. Despatch engineering has provided one sure answer common to them all. (Core baking, mold drying, solution heat treating, stress relieving, aging.) The answer is: perfect control of heat flow throughout every part of the work chamber. That factor is just as important to baking perfect cores as to the proper heat treatment of metals and alloys. Wherever Despatch equipment is used, remarkable performance records have been established.

INCREASE OUTPUT . . . ELIMINATE REJECTS . . . REDUCE COSTS

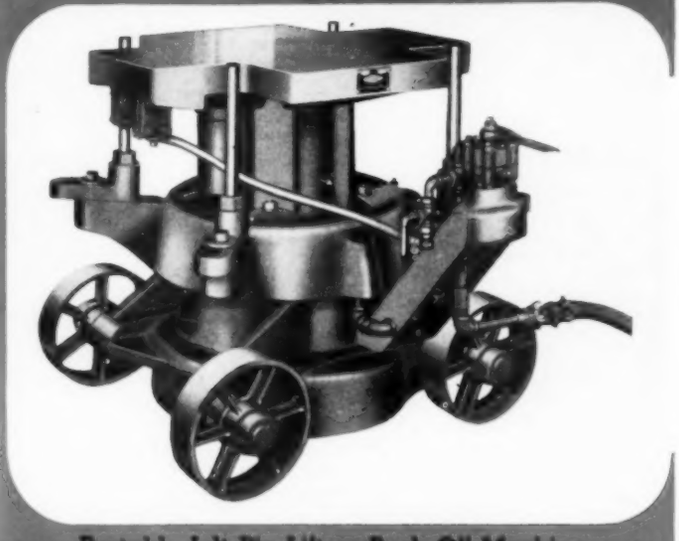
Every foundry operator or manager is vitally interested in getting such results. Let us tell you how Despatch users have accomplished as much as 300% increase in output—how they have practically eliminated rejects from the most exacting jobs—how they have reduced operating costs tremendously right through the foundry!

Write for Bulletin No. 31 for the details of the Despatch Core Ovens with photos of recent installations and information about types of core handling.

DESPATCH OVEN COMPANY MINNEAPOLIS, MINNESOTA

for FOUNDRY MOLDING Use

Plain Jolt Machine



Portable Jolt Pin Lift or Push-Off Machine

Jolt Rollover Draw Machine

"DAVENPORT" MACHINES

They Will Help You Speed Up Production

To increase the capacity of the foundries of America required by the National Defense Program, the use of the finest foundry equipment is demanded.

For over 30 years "Davenport" Molding Machines have proven outstanding in accuracy, speed and dependability. Each year "Davenport" engineers have added to the development of these machines —refinements and improvements; which have made them the Leader in this type of foundry equipment.

When times get back to normal, competition will be keen. Be sure that the foundry equipment that you buy today will meet tomorrow's as well as today's requirements.

"DAVENPORT" LINE OF MOLDING MACHINES

*JOLT ROLLOVER DRAW MACHINE
Model A (Six Sizes)—Capacity from 1,000 to 12,000 lbs.
Model SA (Seven Sizes)—Capacity from 750 to 12,000 lbs.

*JOLT STRIPPER OR PUSH-OFF MACHINES WITH ADJUSTABLE LIFT PINS
Six Sizes—Capacity from 1,000 to 10,000 lbs.

*PLAIN JOLT MACHINES
Fourteen Sizes—Capacity from 200 to 25,000 lbs.

Write today for our NEW 1942 Catalog

DAVENPORT MACHINE & FOUNDRY COMPANY
DAVENPORT, IOWA

Speed Your Grinding in the Hard-to-Get-At Places

with NORTON CONE WHEELS

FOR grinding small radii and the many hard-to-get-at places on castings and welded work, as well as for countless odd jobs around the plant, Norton Cone Wheels are the handy answer. For grinding steel castings and welds they are made of Alundum abrasive; for gray iron and non-ferrous castings the cutting material is Crystolon abrasive.

Available in a wide variety of standard sizes in both the curved and straight sided styles—also in the rectangular shapes known as plug wheels.

Your Norton distributor carries these cone wheels in stock or can obtain them quickly from the nearest Norton warehouse.

NORTON COMPANY
WORCESTER, MASS.
New York Chicago Detroit
Cleveland Philadelphia
Pittsburgh Hartford
Hamilton, Ont.

W-847

NORTON ABRASIVES

Use MODERN METAL HANDLING SYSTEMS

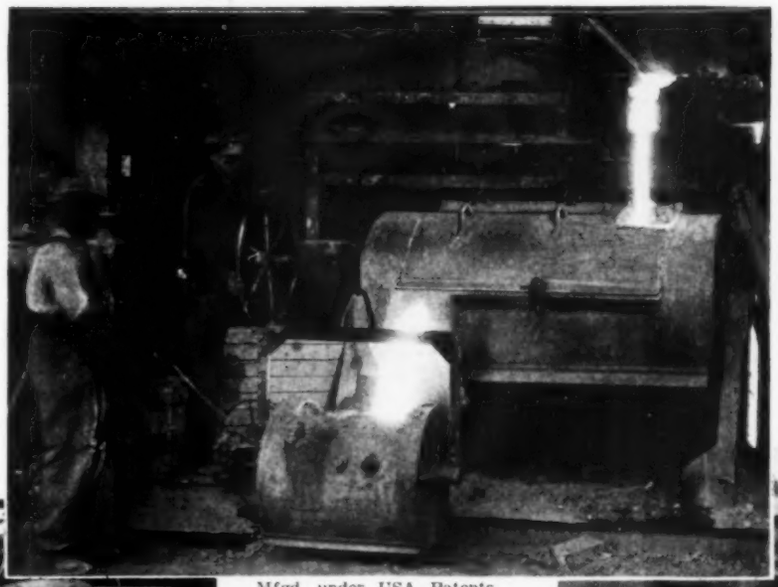
MODERN

MIXING LADLES

Modern 3000 lb. Mixing Ladle delivering metal into a 1000 lb. Modern Distributing Ladle in a stove foundry. Absolute uniformity of metal has resulted.

MODERN

Electric Pouring Devices with 1200 lb. Cylindrical Ladles.



MODERN

EQUIPMENT

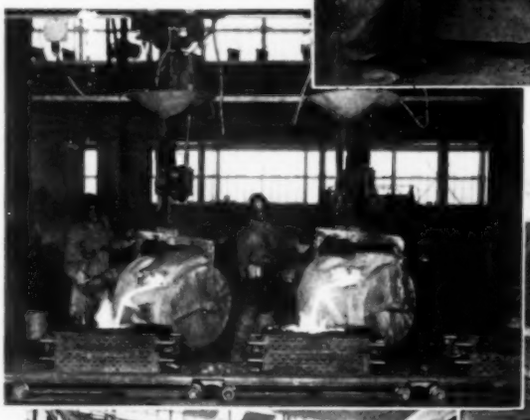
for

Better Pay

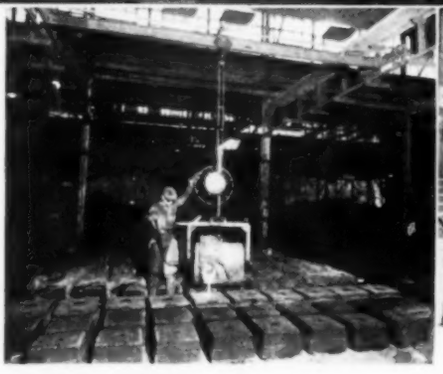
More Profits

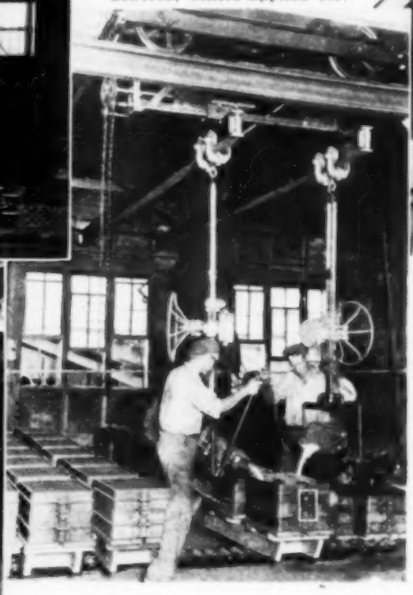
Better Working Conditions

BETTER CASTINGS



Mfgd. under USA Patents 1703231, 1816185, 2073150, 2079765, 2122032, 2100713, 2134785, others applied for.





MODERN one ton Covered and Insulated Ladle above. Metal is held in this ladle 30 to 45 minutes regularly.

MODERN One-man Pouring Devices simplify pouring of heavy floors and eliminate much hard disagreeable labor.

Catalogs on Request

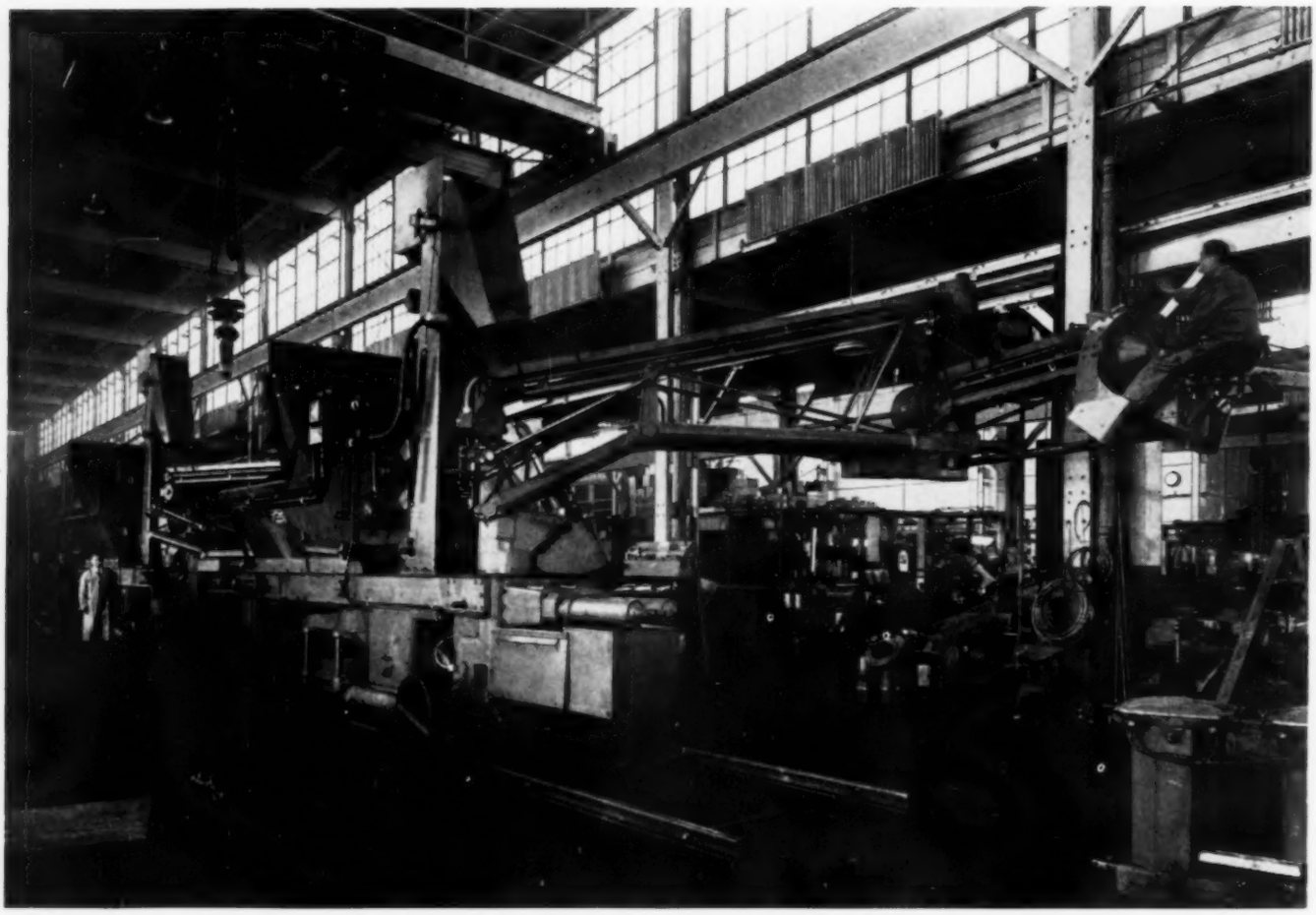
MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WIS., DEPT. 186

MODERN

Cupolas
Cupola Chargers
Covered & Insulated Ladles
Lifetime Geared Ladles
Improved Bottom Pour Ladles
Metal Pouring Systems
Crane & Monorail Systems for Metal & Mold Handling
Furnace Charging Cranes

MODERN EQUIPMENT CO.



SPEEDSLINGERS ON THE PRODUCTION LINES AND ON THE *"FIRING LINES"*

WHEN the National Defense program was launched, the *Speedslinger* was ready to meet the rapid expansion and accelerated production schedules so vital in the defense of Our Country. *Speedslinger* was ready to ram two to four times more sand per minute; *Speedslinger* was ready to ram molds harder than ever before achieved by man or machine; *Speedslinger* was ready to save hundreds of dollars daily in jobbing and production foundries.

Operation of the *Speedslinger* requires of the operator neither brute strength nor long training. It is a simple, reliable, hydraulically-powered device which rams up to 4,000 pounds per minute without labor fatigue. A single, almost effortless move of the hand enables the operator to ram any size pit or flask to a more even density than ever before accomplished. And it may be designed for completely automatic ramming.

Speedslingers . . . Sandslingers . . . Portable Sand Conditioners
Screenarators . . . Speedmullors . . . Gyratory Screens
Sand and Mold Handling Equipment . . . Sand Preparation Equipment

THE BEARDSLEY & PIPER COMPANY 2541 NORTH KEELER AVENUE CHICAGO

SWINDELL ELECTRIC MELTING FURNACES

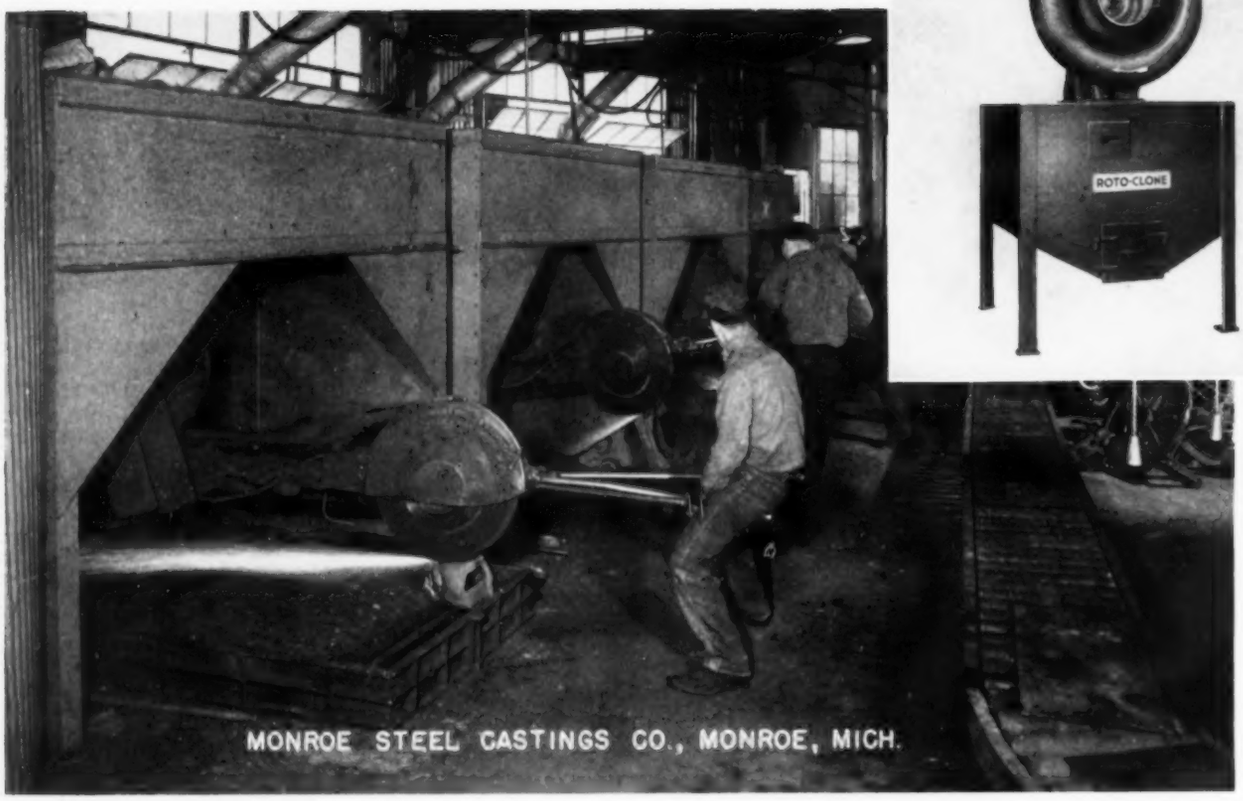
AT THE
CRANE COMPANY'S
CHICAGO FOUNDRY
• TWO SWINDELL TOP CHARGE SWINGING ROOF FURNACES ARE GIVING INCREASED PRODUCTION WITH DEPENDABLE SAVINGS IN TIME—
WHY NOT FIT THESE SWINDELL ADVANTAGES INTO YOUR OPERATING PICTURE NOW?

SWINDELL • DRESSLER *Corporation*

DESIGNERS AND BUILDERS OF MODERN FURNACE EQUIPMENT SINCE 1850

PITTSBURGH, PA.

ROTO-CLONE *Dust Control*
IS IDEAL FOR COLLECTING SWING-FRAME GRINDER DUST



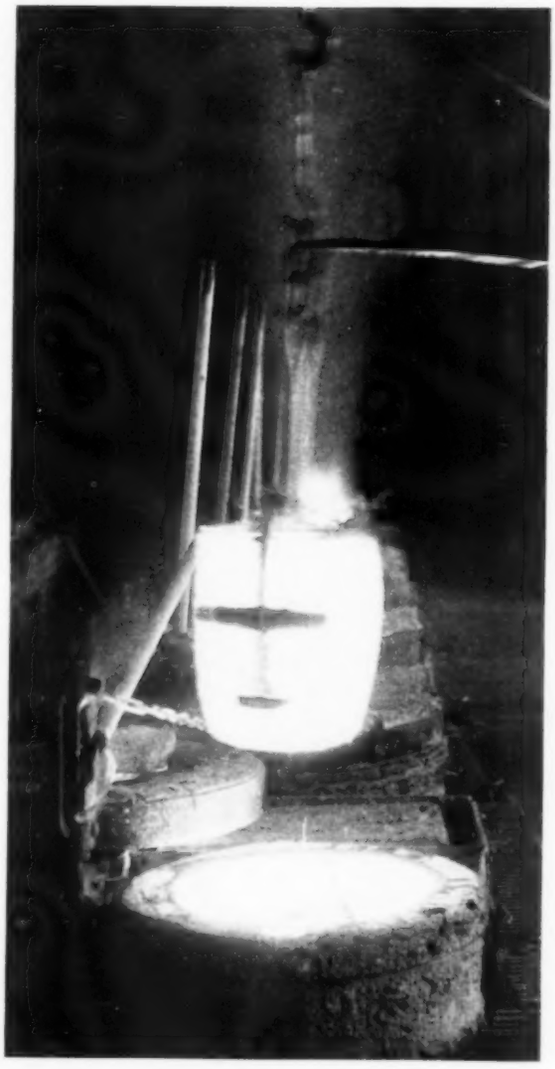
MONROE STEEL CASTINGS CO., MONROE, MICH.

The installation shown above of a No. 24 Type D Roto-Clone for collecting dust from five swing frame grinders is typical of many similar installations. Fine dust is confined within the booths and is then exhausted by the Roto-Clone combined exhauster and dust collector preventing the dispersion of grinding dust to the work room. The Roto-Clone exhausts 12,500 c.f.m. through the five booth enclosure openings housing the swing frame grinders. The superior performance characteristics of the Roto-Clone; the minimum of space required for its installation; and savings effected in piping and power make it especially suitable to swing frame grinder dust control.

Write for complete engineering data and Bulletin No. 272.

AMERICAN AIR FILTER COMPANY, INC.,
263 CENTRAL AVE., LOUISVILLE, KY.

ROTO-CLONE *Dust Control*
ENGINEERED TO YOUR REQUIREMENTS BY THE AMERICAN AIR FILTER CO.



ENOUGH CRUCIBLES ?

9300 crucible furnaces in use melting nonferrous metals.

Keeping them supplied with crucibles is an earnest responsibility.

The crucible manufacturers have added to their capacity and the Government has aided in securing supplies of graphite.

The maximum demand for crucibles will continue to be supplied.

Did you receive copies of the booklet "How to Cut Crucible Costs"? It will help you to get more heats per crucible. Copies may be had by writing to the address below.

CRUCIBLES FOR ECONOMY

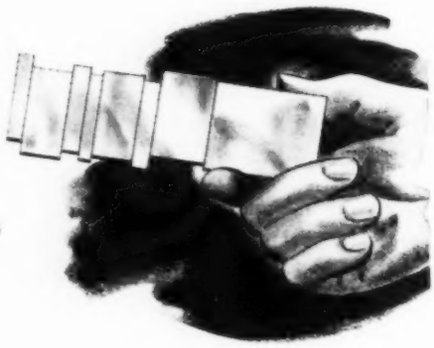
CRUCIBLE MANUFACTURERS ASSOCIATION

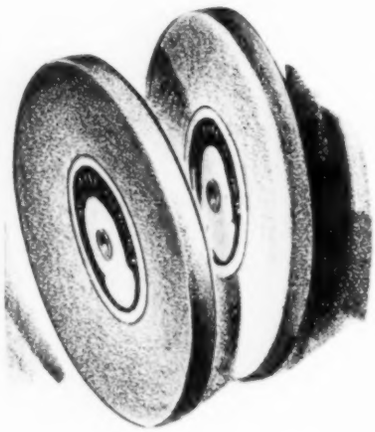
90 WEST STREET, NEW YORK, N. Y.

This is one of the most important manufacturing plants in America!

In this backyard shack George Webber of Cleveland is cracking a major defense bottleneck. He has found a way to produce in quantity those vital precision instruments known as block gauges. Few men have ever known how to finish these small blocks of steel to the microscopic accuracy required for modern mass production. Now Webber's secret machine turns out 37 sets, of 81 blocks each, every week with the aid of Aloxite Brand Aluminum Oxide Grinding Wheels.

So perfectly are Webber's block gauges finished with these wheels that they cling with astonishing force when wrung together. Accurate to within four millionths of an inch, they are the standard of measurement for thousands of precision parts essential to America's defense program.





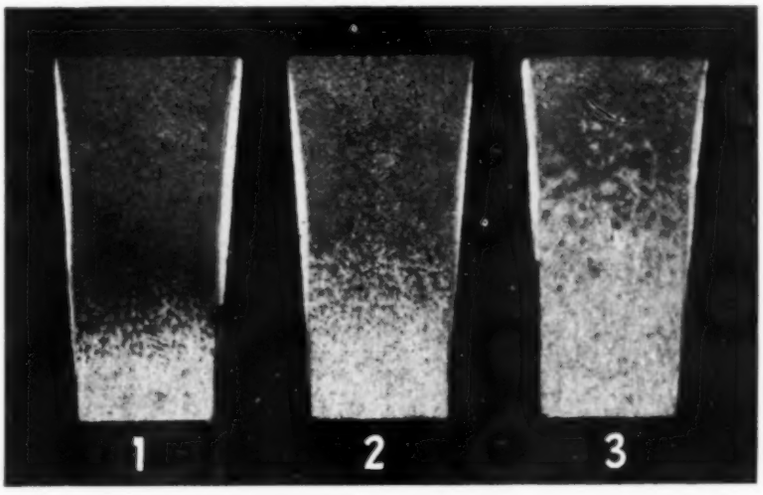
Our ability to furnish the right product for any abrasive need is the result of outstanding research, engineering and manufacturing facilities. Perhaps we can help you speed up production and cut costs. The Carborundum Company, Niagara Falls, New York.

CARBORUNDUM
REG. U.S. PAT. OFF.
ABRASIVE PRODUCTS

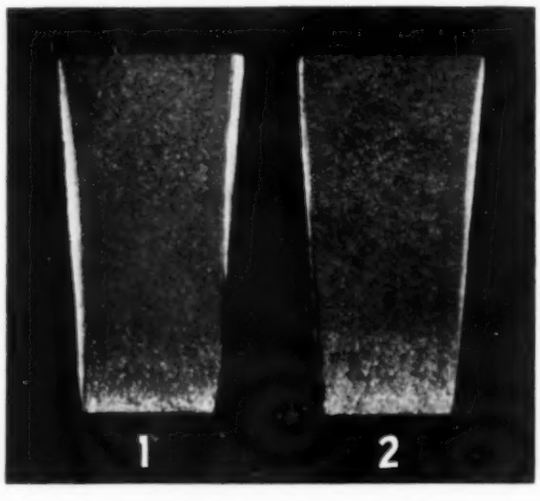
Carborundum and Aloxite are registered trade-marks of and indicate manufacture by The Carborundum Company.

For Adding Chromium to Cast Iron In the Ladle

Use S.M. Ferrochrome



Chill bars of a hard base iron, showing the effect of adding 0.50 per cent chromium in the ladle. 1. *No chromium added.* 2. *Chromium added as Foundry Grade Ferrochrome.* 3. *Chromium added as S.M. Ferrochrome. Observe that the latter produces a considerably greater increase in the depth of chill, showing that less of this alloy is needed.*



Chill bars of a soft base iron, showing the effect of adding 0.50 per cent chromium in the ladle. 1. *Chromium added as Foundry Grade Ferrochrome.* 2. *Chromium added as S.M. Ferrochrome. Note that the latter again produces a deeper and denser chill.*

A New and Improved Alloy

If you want to obtain the beneficial effects of chromium additions to cast iron in the ladle, an improved alloy is now available—S.M. Ferrochrome. This new alloy dissolves more readily in the molten iron than other grades of ferrochrome, and results in a higher recovery of chromium and a greater increase in the depth of chill per unit of chromium added. Thus the use of S.M. Ferrochrome helps to conserve chromium, a strategic defense material.

Because S.M. Ferrochrome dissolves rapidly in the molten metal, it results in uniform distribution of the chromium, and thus prevents the formation of hard spots in the iron caused by incomplete solution. Also, the use of this alloy permits the ladle addition of larger amounts of chromium. As much as 4 per cent chromium has been satisfactorily added as S.M. Ferrochrome to cast iron in the ladle, with recoveries of 90 per cent.

The addition of chromium to cast iron improves its wear resistance, minimizes growth at high temperatures, increases its resistance to heat, and improves its physical properties.

Ask to have one of our metallurgists call and explain further the advantages of adding S.M. Ferrochrome to cast iron in the ladle. He can tell you also about other "Electromet" ferro-alloys for the cast iron foundry and can give you practical help in using them to obtain better iron at lower cost. This service is yours for the asking.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York, N. Y.

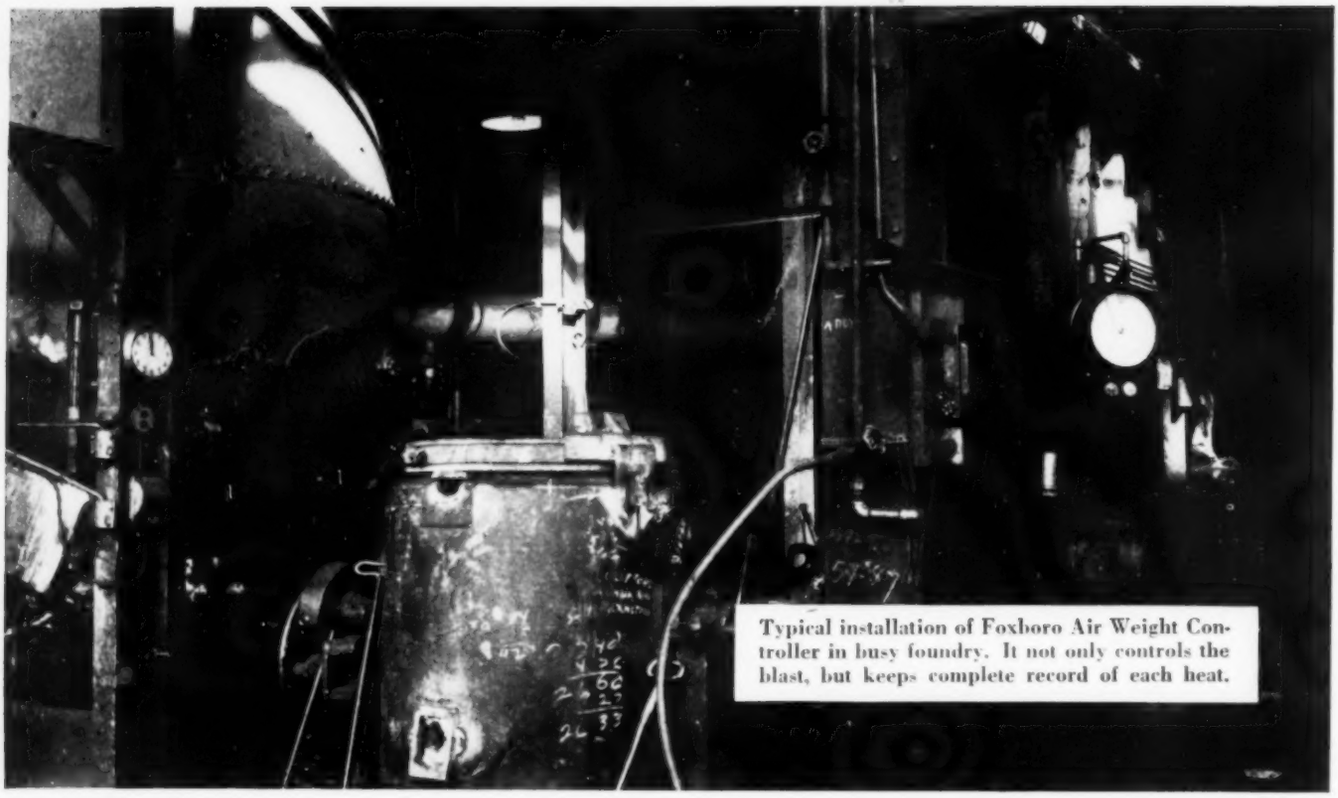
The word "Electromet" is a registered trade-mark of Electro Metallurgical Company.

"Electromet" Ferro-Alloys and Metals are available through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet
Trade-Mark
Ferro-Alloys & Metals

This "Phantom Foundryman"

SPEEDS UP CUPOLA OUTPUT!



Typical installation of Foxboro Air Weight Controller in busy foundry. It not only controls the blast, but keeps complete record of each heat.

Easily-installed Foxboro Air Weight Controller keeps heats hotter, more uniform.

All you need to do is set the index pointer on a Foxboro Air Weight Controller, and you'll get the rate of blast you want . . . more exactly than any human hands can maintain it for you! Day-in, day-out, regardless of weather conditions, this "phantom foundryman" automatically controls air supply *by weight* instead of volume . . . insures better combustion and uniformly hotter heats without oxidation of metal.

The effective output of most cupolas can be stepped up promptly by the simple installation of this unique Foxboro Controller. Scrap is radically reduced . . . pigging is completely eliminated . . . your percentage of faulty castings can be held to new lows!

Write for Bulletin B-268 on Foxboro Air Weight Controllers, or for detailed information on any other instruments you may need. The "Phantom Foundryman" is only one example of Foxboro's Creative Instrumentation to make industrial processes operate more productively. **The Foxboro Company, 32 Neponset Avenue, Foxboro, Mass., U. S. A.** Branches in principal cities of U. S. and Canada.

RECORDING · CONTROLLING · INDICATING

FOXBORO
REG. U. S. PAT. OFF.
Instrumentation

This Cleveland Tramrail Crane has been serving The Pohlman Foundry Co., Buffalo, N. Y., with complete satisfaction since it was installed in 1926.

Many cranes will be found "rheumatic" and hard going long before they have reached the age of 16. Despite continued repairs and attention, workmen's blood pressure will reach a high mark each time a load must be moved with them.

To handle thousands of tons of materials year in and year out, as smoothly and easily as the day it was installed, a crane must be quality built throughout. Every part must be correctly designed and perfectly fitted.

It is because Cleveland Tramrail does not skimp on quality that service records of 15 and 20 years are nothing unusual. And most of these cranes will be found on the job another 15 or 20 years from now.

. . . In Service 16 YEARS . .

and still going strong!

Motor-driven System ---
Hand-propelled System ---
whatever your sand handling problem, Cleveland Tramrail can aid you.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 East 283rd St. Wickliffe, Ohio

GET THIS BOOK!

BOOKLET No. 2008 . . Packed with valuable information. Profusely illustrated. Write for free copy on your company letterhead.

MANUFACTURERS OF • CLEVELAND CRANES • CLEVELAND TRAMRAIL • STEELWELD BENDING PRESSES

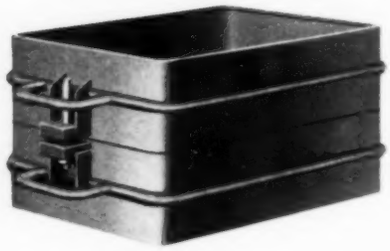
CLEVELAND TRAMRAIL

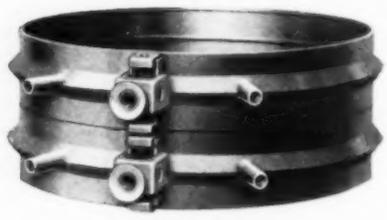
OVERHEAD MATERIALS HANDLING EQUIPMENT

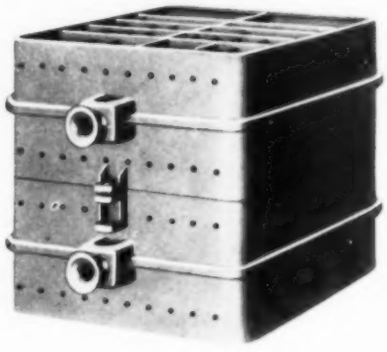
Why take time out for flasks?

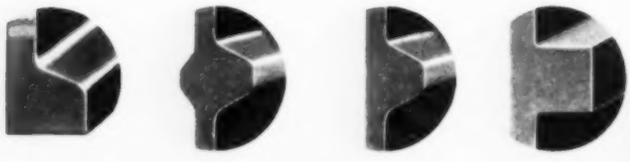
STERLING FLASKS will work for you right around the clock. There is no time lost for patching and repairs; they're built for steady going. Every flask is made from a special rolled section that gives you maximum strength with minimum weight. Integral ribs and flanges and all welded construction are your guarantee that they won't let you down. Every detail is made to meet modern demands for fast work and profit making efficiency.

They are the first choice of more than 3500 different foundries who are leaders in every line. Why not guarantee results in your own plant by equipping with Sterling Flasks?









ROLLED STEEL WITH SOLID CENTER REINFORCING RIB AND SQUARE FLANGES; FULL WIDTH BEARING

Patent No. 1974892

Sterling
WHEELBARROW COMPANY
7100 W. WALKER STREET
MILWAUKEE, WISCONSIN

HARNESSING THE
WHIRLWIND!
THE BUELL DUST RECOVERY SYSTEM DOES IT... with the famous van Tongeren Cyclone, the only method of harnessing the whirlwind energy of the "double eddy current" (present in all cyclone-type collectors) and putting it to work to give you greater collection efficiency on all dust sizes.
No Other Collector Employs This Principle
Only Buell gives you the plus value of the van Tongeren System's greater recovery efficiency. It saved one user $40,000 in 13 months! Buell (van Tongeren) Dust Collectors have many other advantages . . . all good reasons why so many industrial leaders prefer Buell. Investigate!
24-page bulletin, "Dust in Industry" sent on request
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DUST COLLECTORS

BUELL ENGINEERING COMPANY, INC., 14 CEDAR STREET, NEW YORK

NATION-WIDE SERVICE THROUGH OFFICES OF EITHER BUELL ENGINEERING CO. OR B. F. STURTEVANT CO.

Schundler FOUNDRY BENTONITE

24-HOUR SERVICE
TO MOST FOUNDRY CENTERS

✦

Akron, Ohio	H. S. Steller
Birmingham, Ala.	Foundry Service Co.
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Cincinnati, Ohio	Dolbi Foundry Sand Co.
Coldwater, Mich.	Foundry Materials Co.
Dallas, Texas	Sorada & Page, Inc.
Edwardsville, Ill.	Midwest Foundry Supply Co.
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Kansas City, Mo.	Sorada & Page, Inc.
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Minneapolis, Minn.	E. R. Frost Co., Inc.
Moline, Ill.	Midwest Foundry Supply Co.
New Orleans, La.	Sorada & Page, Inc.
Oklahoma City, Okla.	Sorada & Page, Inc.
Philadelphia, Pa.	Penn. Fdy. Supply & Sand Co.
Portland, Ore.	Miller & Zahrung Chemical Co.
St. Louis, Mo.	Midwest Foundry Supply Co.
San Francisco, Cal.	Industrial Supply Co.
Seattle, Wash.	Carl F. Miller & Co.
Toronto, Canada	Muir Foundry Supply Co.
Tulsa, Okla.	Sorada & Page, Inc.
Wichita, Kans.	Sorada & Page, Inc.

An UNLIMITED *Supply of the* HIGHEST QUALITY, UNIFORM BENTONITE

Combined Schundler holdings constitute, literally, an unlimited supply of the highest quality foundry bentonite—no need to worry now or in the future about the availability of all the bentonite you need.

LARGEST SINGLE DEPOSIT RECENTLY PURCHASED

Added to our resources is a recently purchased 2200-acre tract believed to contain the largest *single* deposit of *highest quality* bentonite in the country. Preliminary surveys indicate upwards of 3,000,000 tons of this superior bentonite on this additional tract, added to our already substantial holdings.

HIGHEST GRADE—AND LOTS OF IT!

In short, Schundler Bentonite is and *will be* available in any quantity you'll ever need. The opportunity to supply your requirements and service your account will be welcomed by your Schundler Jobber.

. . . A DEPENDABLE PRODUCT SOLD WITH

Service RESEARCH and CONTROL

Your Foundry Bentonite Service Staff

PAUL S. DENNING
Research Director

FRANCIS COBB
Research

AMEL AMBERSON
Control

Bentonite Handbook

Gives valuable information on the foundry uses of bentonite, suggested sand mixes, and other helpful data. A copy is yours for the asking.

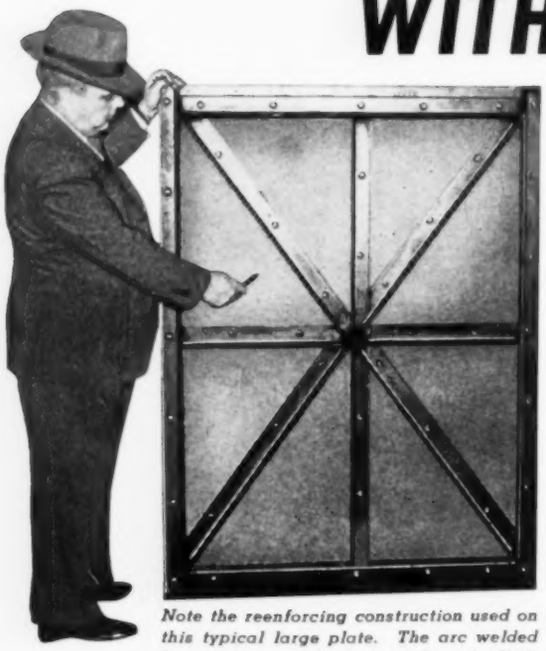
To serve you better—we maintain outstanding research and control laboratories which exist to provide you with more complete information and assistance on your sand problems. *Research* to lead the way in the better application of bentonite in foundry use. *Control* to guarantee your always receiving a highest quality, uniform product. *In addition,* we offer you the services of one of the country's outstanding authorities on foundry sand practice, at no expense to you.

These services, this staff are always at your disposal.

F. E. SCHUNDLER & CO., 504 Railroad Street, JOLIET, ILLINOIS

H COMPLETE AND PRACTICAL ADVISORY SERVICE

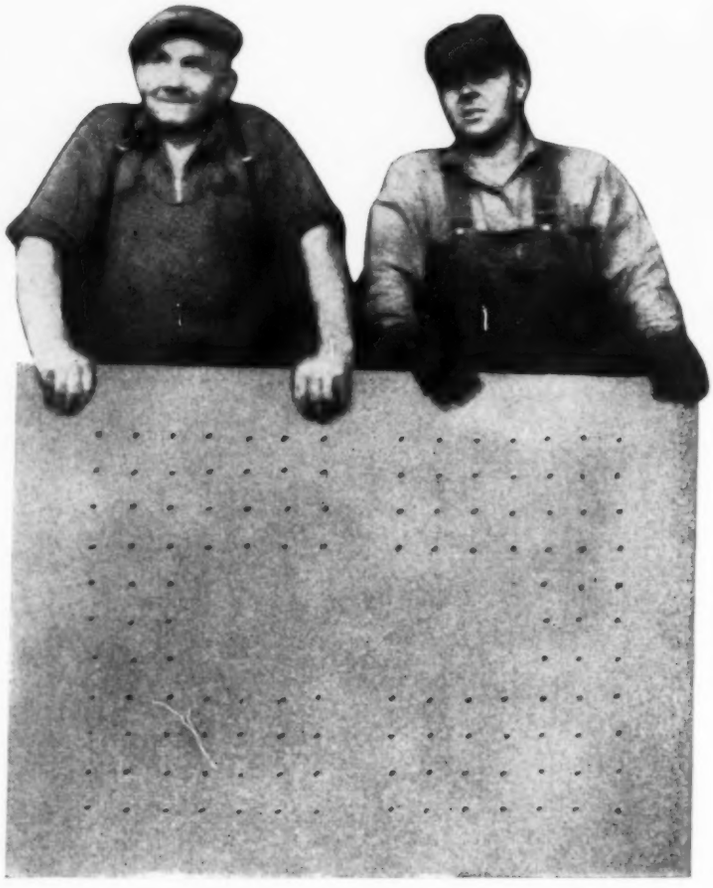
CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!



Note the reenforcing construction used on this typical large plate. The arc welded frame gives rigidity, strength and eliminates deflection.

IT IS BEING DONE ON DIAMOND REENFORCED STEEL CORE PLATES

These special core plates are designed to carry large cores up to 1200 lbs., cores of any size, without deflection or warping.



You may obtain Diamond Core Plates to suit your own special requirements. They are furnished with or without perforations and in all smaller, standard sizes—plain or reenforced as indicated by your needs.

Send us detailed information on your core baking problem and we'll be glad to design a plate to handle the job. Weight of core and dimensions, in particular.

DIAMOND

CLAMP AND FLASK COMPANY

Telephone 2553 **Richmond, Indiana**

Designers of* CORE PLATES, JACKETS, BANDS, FLASKS *since 1889

Is Conditioned Better With a Royer!

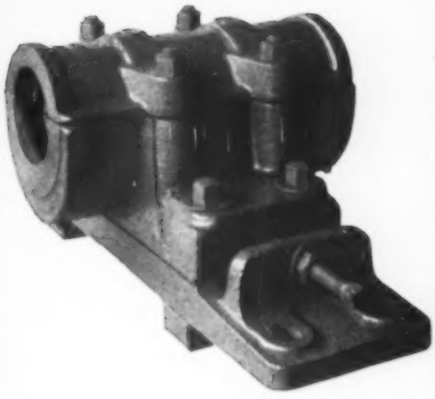
Whether you use Eastern, Western or a synthetic sand, you can condition it better with a Royer. Foundries in all parts of the country using all types of sand report that they get satisfactory "6 point" conditioning from their Royers—and their repeat orders for Royer Sand Separators and Blenders bear this out! You may take a little leeway in your mixes or the type sand you use, *but when your sand conditioning is haphazard look out for trouble.*

You can't afford to penalize yourself with poorly prepared sand these days when a Royer alone, which costs less to begin with, can give you these six essentials for properly conditioning sand:

- Thorough refuse removal.
- Positive lump breaking.
- Complete blending and mixing.
- Distributes moisture evenly.
- Increases permeability.
- Double aerates—once on the belt and once as it is being discharged.

There's a Royer for the sand conditioning needs of every ferrous and non-ferrous jobbing foundry, combination conditioners and scrap removers for large iron and steel jobbing foundries and large stationary units to be included in the sand system of production foundries. Get the facts and you'll get a Royer.

THE ROYER



The Medart Co., St. Louis, Mo., makers of pillow blocks, pulleys, shafting and other power transmission equipment and shaft and tube turning, straightening, sizing and polishing machinery use a Model "NC-2" Royer in their modern foundry to produce sound, smooth castings from better conditioned sand.

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

WORLD'S LARGEST!

WEIGHS 18,000 LBS!
This is the total weight of the unit—coils—castings—shafting—coil covers, etc.

4 FT. IN DIAMETER!
48" diameter x 63" across face!

5,900 LBS. MAGNET WIRE!
Enough copper wire to reach from Milwaukee to Chicago!

1,800 LBS. BRONZE!
Bronze coil covers and end rings instead of steel—eliminates short-circuiting of lines of force—means greater power.

AIR-COOLED!
Serrated design incorporates radial and longitudinal ducts to provide maximum air circulation for cool, efficient operation.

Dings MAGNETIC SEPARATION HIGH INTENSITY

DINGS COMPLETES BIGGEST MAGNETIC PULLEY EVER BUILT!

"IF it's a job for magnetic separation, it's a job for Dings!" This slogan is strengthened by Dings latest engineering achievement in overcoming the problems involved in building the largest magnetic pulley in the world. You may not require separators of such size but when you buy from Dings you know you are buying from an organization with the experience and ability to handle the toughest jobs.

For purification, concentration, separation—removing chunks of tramp iron or the most feebly magnetic iron compounds from dry materials or liquids—you'll find a Dings High Intensity Separator for the job. Write today.

DINGS MAGNETIC SEPARATOR COMPANY
512 E. SMITH STREET MILWAUKEE, WISCONSIN

SEPARATION HEADQUARTERS SINCE 1899

Announcing the

1ST WESTERN HEMISPHERE FOUNDRY CONGRESS

In conjunction with the 46th Annual Convention of the American Foundrymen's Association and Foundry and Allied Industries Show

On November 25 the Board of Directors of the American Foundrymen's Association was asked to consider staging, in conjunction with the 46th Annual Convention, a Western Hemisphere Foundry Congress. By letter ballot this was unanimously approved and letters were immediately prepared in the Spanish and Portuguese languages for mailing to South and Central American countries inviting participation in a program to promote Hemisphere Solidarity and Common Defense.

Before announcement was released to the foundrymen of South, Central and North America our government was attacked and war declared. The program now becomes, as in the first World War, an ALL-OUT Contribution of the Foundry Industry to increased production of WAR MATERIALS.

The theme of the Congress, Convention and Show in Cleveland next April will be a Demonstration of the industry's Contribution to, and backing of our President's pledges of COMPLETE VICTORY.

FOUNDRY and ALLIED INDUSTRIES SHOW } *Cleveland,* APRIL 18, 20 - 24, 1942

Increase Production with
ROTOPLANE Speed Sifters

"Hard-to-Please" Foundries Standardize on Rotoplane!

ORDER FROM YOUR FOUNDRY SUPPLY HOUSE

Try ROTOPLANE in your plant. You, too, will find it increases production, does *all* your sifting more quickly and economically. One size and type for all sifting jobs.

ROTOPLANE is built for long, dependable service. Strong, one-piece frame gives remarkably effective vibration. Smooth, free, rotary action. All mechanism completely enclosed and dustproof. Weight approx. 90 lbs., 62 in. high overall.

Steel-mounted sieves instantly interchangeable. No jagged screen edges, no storage problem. 20 in. diameter clear sifting area.

TEN DAYS FREE TRIAL.

$175.00 f.o.b. Chicago—complete with cable, safety ground wire, one sieve (2-4 mesh). Standard ⅓ h.p. motor, 115-230 volts 60 cycle single phase.
Prices with other motors quoted on request.

ELECTRIC VIBRATORS

True-to-pattern castings make satisfied customers . . . more repeat business. Increase your production and castings quality with RED Electric Vibrators. Sturdy, dustproof, lowest operating cost (electricity does not freeze). Unequaled for consistent year-'round results in foundries all over the world.

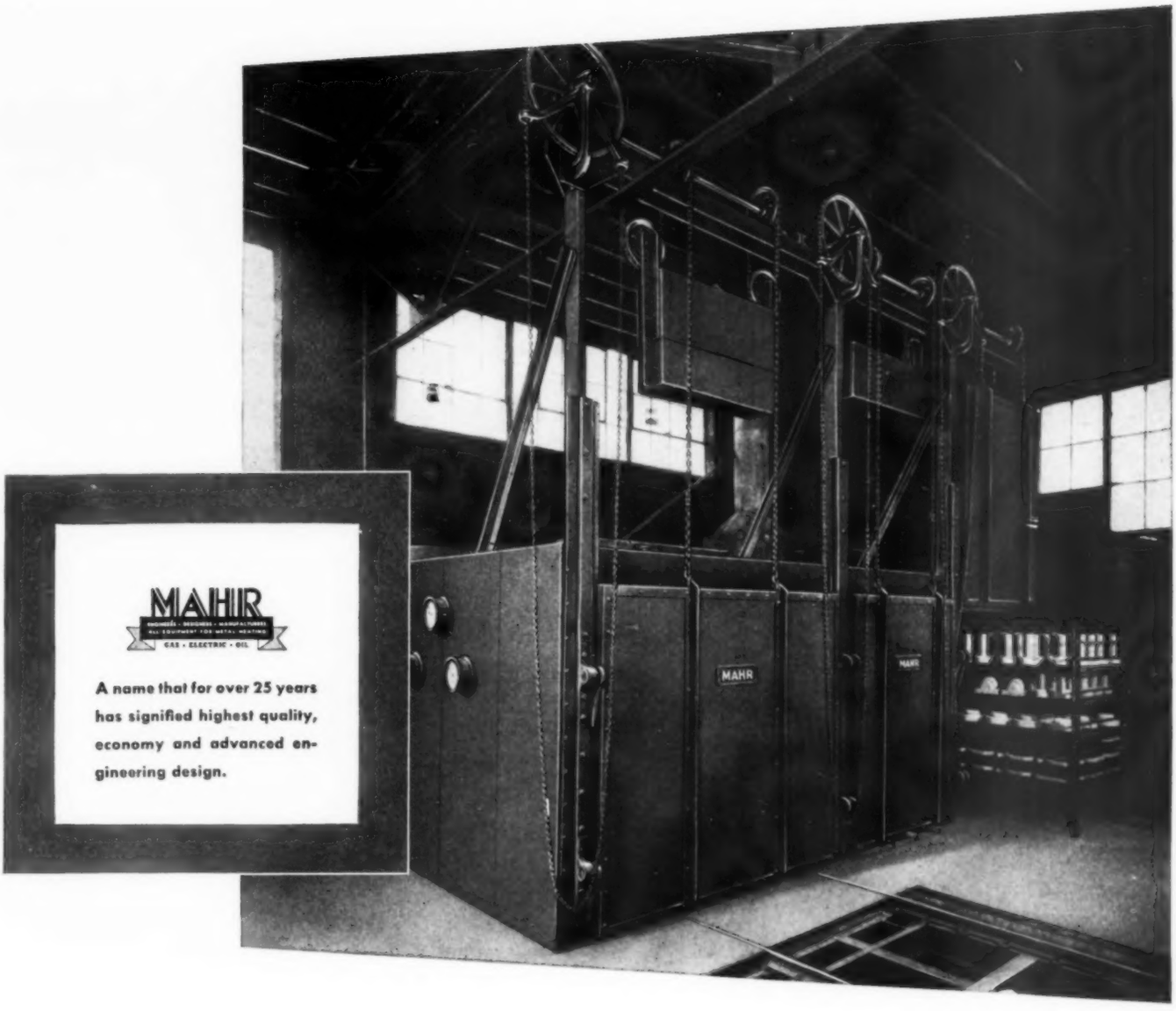
(All Prices f.o.b. Chicago)

No. 1—Light match plate work	$10.00	No. 5—Heavy match plate, tub, bench	$17.00
No. 2—Medium match plate	13.00	No. 9—Machine and heavier	24.00

FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard Street — Chicago, Illinois

CABLE ADDRESS: "ROTOPLANE CHICAGO"



HELPING THE MEN WHO HELP THE MEN

YOUR FOUNDRY today stands as the very foundation of this defense program. From it flow the castings that become basic parts of important armaments and machines . . . SPEED is on every tongue. "Give us speed", cry the men on the front lines. "Hurry", plead the men who make things for these other men . . . Your foundry today is geared to fast production. Your men work hurried hours. Losses of any kind—time or materials—are waste. In making cores, you can't afford "throw outs". MAHR OVENS help prevent waste by assuring perfect baking *the first time.*

Write Us Today for the interesting story of MAHR CORE OVENS and other MAHR foundry equipment. Ask us for complete details and prices. Address Department F-10.

MAHR *heat treating products include:*

Annealing Furnaces
Crucible Melting Furnaces
Babbitt Furnaces
Ladle Heaters
Safety Vacuum Torches
Blowers—Burners—Valves

DIAMAHR

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
MINNEAPOLIS, MINNESOTA, U. S. A.

LIGNOLITE ... New Pattern Plate Material Wins Foundry Approval

LOW-COST, LIGHT-WEIGHT LIGNIN PLASTIC FOUND TO BE IDEALLY SUITED FOR PATTERN PLATES

● Fully tested over long periods in actual foundry use, LIGNOLITE has been proven an outstanding alternate for critical materials normally used for pattern plates.

LIGNOLITE—WHAT IT IS

LIGNOLITE is a laminated Lignin Plastic. It is a dense material, strong, light in weight, and water resistant. In pattern plate use, LIGNOLITE has virtually all the qualities of metal itself, and is "worked" as such.

ADVANTAGES FOR PATTERN PLATE USE

1—**WATER-RESISTANT**—Because LIGNOLITE is inherently water-resistant, it will not warp, crack, swell when exposed to high humidity conditions or in contact with wet sand. Also resists oils, greases, dilute acids.

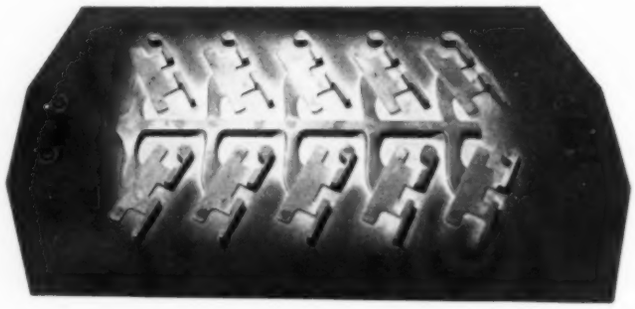
2—**LIGHT WEIGHT**—Approximately one-half the weight of aluminum, three-fourths the weight of magnesium, one-fifth the weight of steel.

3—**HIGH STRENGTH**—Is highly resistant to shock. Has a dense, uniform structure and can satisfactorily be used with vibrators.

	Lbs. sq. inch
Compressive strength	25,000-35,000
Flexural strength	15,000-21,000
Tensile strength	9,000-14,000

4—**ABRASION RESISTING SURFACE**—Standard finish is a fine grain texture which prevents sand slippage and sticking. Material is free from pits or defects, is non-corrosive and will not sweat. Surface hardness is 40 Brinell.

5—**EASY MACHINABILITY**—LIGNOLITE can be readily milled, sawed, drilled, tapped, turned, filed, sanded or otherwise machined with metal working tools.



"Typical metal pattern mounted on 12" x 18" LIGNOLITE Plate."

STANDARD SIZES—HOW TO ORDER

Plates are octagonal in shape and have a 1" allowance for the flask and 2-1/2" for ears; are available for any size flask in thicknesses from 3/8" to 1-1/8" in 1/16" steps. Order by flask size and specify thickness desired. Give details on nature of pattern to be mounted and we'll recommend proper thickness, if you wish. Also supplied in 46" x 46" boards if you wish to cut your own plates.

IMMEDIATE DELIVERY

NO PRIORITIES REQUIRED as Lignin is not a restricted material. Your requirements for LIGNOLITE Pattern Plates can be filled without limitation or delay.

Write for complete information, including sample. Or better still, place a trial order for several LIGNOLITE PATTERN PLATES and test them on your work.

MARATHON CHEMICAL COMPANY

Division of Marathon Paper Mills Company

ROTHSCHILD WISCONSIN

Defense Savings Pay-Roll Allotment Plan

How company heads can help their country, their employees, and themselves

voluntary pay-roll allotment plan

helps workers provide for the future

helps build future buying power

helps defend America today

This is no charity plea. It is a sound business proposition that vitally concerns the present and future welfare of your company, your employees, and yourself.

During the post-war period of readjustment, you may be faced with the unpleasant necessity of turning employees out into a confused and cheerless world. But you, as an employer, can do something *now* to help shape the destinies of your people. Scores of business heads have adopted the Voluntary Pay-roll Allotment Plan as a simple and easy way for every worker in the land to start a *systematic* and *continuous* Defense Bond savings program.

Many benefits . . . present and future. It is more than a sensible step toward reducing the ranks of the post-war needy. It will help spread financial participation in National Defense among all of America's wage earners.

The widespread use of this plan will materially retard inflation. It will "store" part of our pyramiding national income that would otherwise be spent as fast as it's earned, increasing the demand for our diminishing supply of consumer goods.

And don't overlook the immediate benefit . . . money for defense materials, quickly, continuously, *willingly*.

Let's do it the American way! America's talent for working out emergency problems, democratically, is being tested today. As always, we will work it out, without pressure or coercion . . . in that old American way; each businessman strengthening his *own* house; not waiting for his neighbor to do it. That custom has, throughout history, enabled America to get things done *of its own free will.*

In emergencies, America doesn't do things "hit-or-miss." We would get there *eventually* if we just left it to everybody's whim to buy Defense Bonds when they thought of it. But we're a nation of businessmen who understand that the way to get a thing done is to *systematize* the operation. That is why so many employers are getting back of this Voluntary Savings Plan.

Like most efficient systems, it is amazingly simple. All you have to do is offer your employees the convenience of having a fixed sum allotted, from each pay envelope, to the purchase of Defense Bonds. The employer holds these funds in a separate bank account, and delivers a Bond to the employee each time his allotments accumulate to a sufficient amount.

Each employee who chooses to start this savings plan decides for himself the denomination of the Bonds to be purchased and the amount to be allotted from his wages each pay day.

How big does a company have to be? From three employees on up. Size has nothing to do with it. It works equally well in stores, schools, publishing houses, factories, or banks. This whole idea of pay-roll allotment has been evolved by businessmen in cooperation with the Treasury Department. Each organization adopts its own simple, efficient application of the idea in accordance with the needs of its own set-up

No chore at all. The system is so simple that A. T. & T. uses exactly the same easy card system that is being used by hundreds of companies having fewer than 25 employees! It is simple enough to be handled by a check-mark on a card each pay day.

Plenty of help available. Although this is *your* plan when you put it into effect, the Treasury Department is ready and willing to give you all kinds of help. Local civilian committees in 48 States are set up to have experienced men work with you just as much as you want them to, and no more.

Truly, about all *you* have to do is to indicate your willingness to get your organization started. We will supply most of the necessary material, and no end of help.

The first step is to take a closer look. Sending in the coupon in no way obligates you to install the Plan. It will simply give you a chance to scrutinize the available material and see what other companies are already doing. It will bring you samples of literature explaining the benefits to employees and describing the various denominations of Defense Savings Bonds that can be purchased through the Plan.

Sending the coupon does nothing more than signify that you are anxious to do *something* to help keep your people off relief when defense production sloughs off; *something* to enable *all* wage earners to participate in financing Defense; *something* to provide tomorrow's buying power for your products; *something* to get money *right now* for guns and tanks and planes and ships.

France left it to "hit-or-miss" . . . and *missed. Now* is the time for *you* to act! Mail the coupon or write Treasury Department, Section A, 709 Twelfth St. NW., Washington, D. C.

FREE - NO OBLIGATION

Treasury Department, Section A,
709 Twelfth St. NW., Washington, D. C.

Please send me the free kit of material being used by companies that have installed the Voluntary Defense Savings Pay-Roll Allotment Plan.

Name _____

Position _____

Company _____

Address _____

GPO 428498

Something You Can BANK ON

—whether it's BOMBS *or* BULLETS — BEARINGS *or* BILLETS —

WHEELABRATOR

Will Clean Your Work

- MORE EFFICIENTLY
- IN LESS TIME
- AT LOWER COST

WHEELABRATING BRINGS YOU THESE ADVANTAGES

1. **HIGH-SPEED CLEANING**—reduces costs; speeds up shipment of orders.
2. **CUTS CLEANING COSTS** up to 50% and more because: it is faster; saves power up to 80%; saves labor; saves time in loading and unloading; saves space; saves abrasive; saves on operating and maintenance costs.
3. **REMOVES ALL TRACE OF SAND AND SCALE** down to the virgin metal, with the result that:
   - Machining and grinding are faster.
   - Tools last longer.
   - Inspection is simplified.
   - Hardness readings are accurate.
4. **IMPROVED APPEARANCE**—Wheelabrated products are bright, silvery, and uniformly clean.
5. **PROVIDES PERFECT BOND** for final finishing such as enameling, plating, galvanizing, painting, etc.
6. **PRODUCES WIDE RANGE OF FINISHES**—from fine to coarse.
7. **HANDLES WIDE RANGE OF WORK**—from fine springs to heavy armor plate. Ideal for special and unusual applications.
8. **ELIMINATES CHIPPED AND ROUNDED CORNERS**—only a minimum amount of stock need be allowed for finish machining.

SPEED DEFENSE

TRADE MARK

THE AMERICAN MOLDER

SPEED UP WITH AMERICAN

BUGLES or BAYONETS
BATHTUBS or BRAKEDRUMS

THE MOST logical approach to your cleaning problem undoubtedly lies in a consideration of one or more of these important factors: Better cleaning—Faster cleaning—Cheaper cleaning.

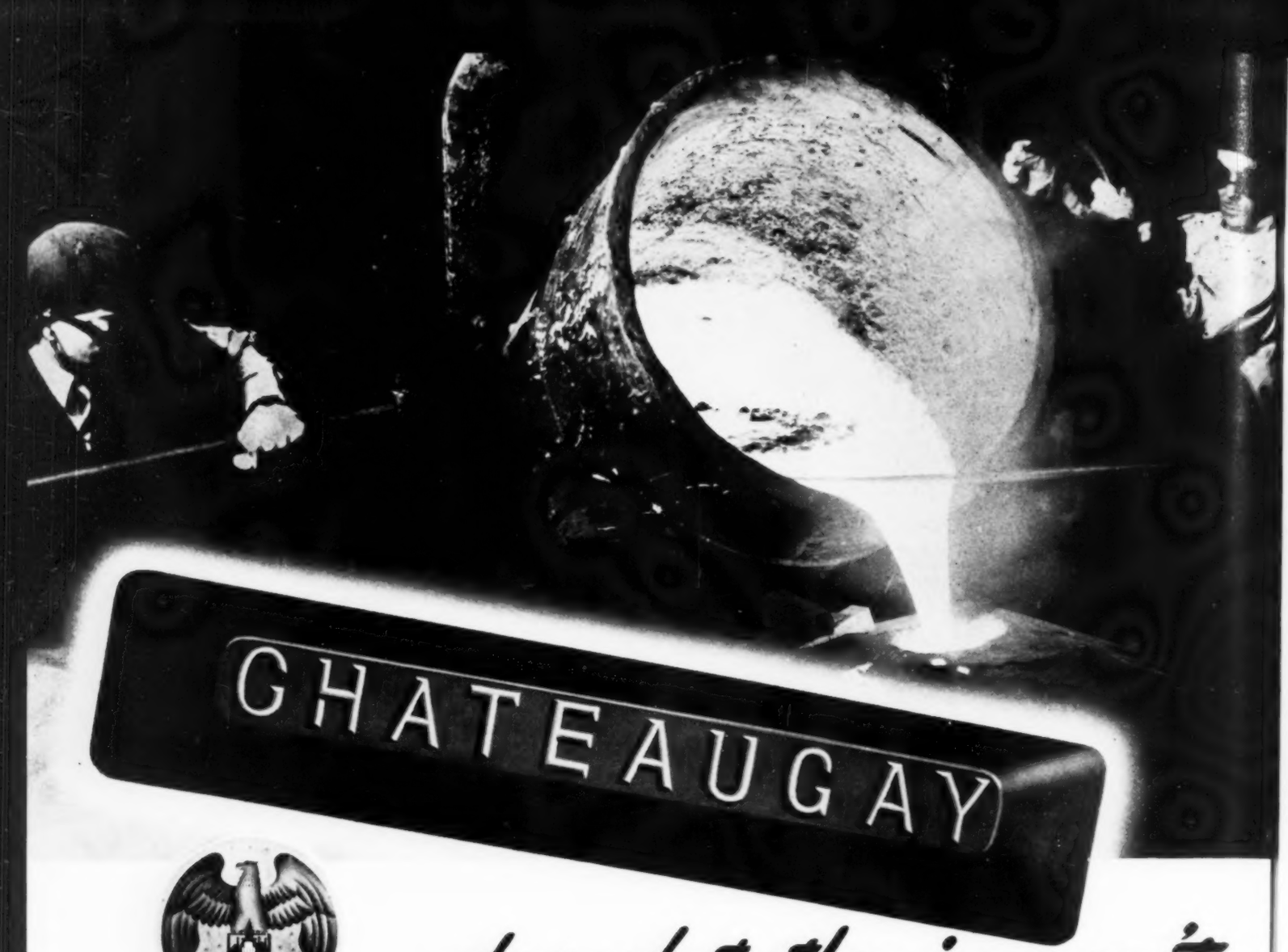
That the WHEELABRATOR will give you all three of these is something you can "Bank on." You can prove this in two ways: By actual test on your own product and by obtaining the comments of users—there are more than 1300 of them!

The "bankable" savings effected by this modern speed cleaning process result from reduced tonnage costs, lower operating and maintenance costs, quicker inspection, improved machinability and grinding, and longer tool life. Few investments will pay the return you can get from the WHEELABRATOR.

Another big advantage in buying WHEELABRATOR equipment is the fact that you have a wider range of sizes and types from which to choose. Among the Tumblasts, for example, you can make your selection from seven popular sizes ranging from 1 cu. ft. to 30 cu. ft. load capacity. Multi-table machines are correspondingly complete in size range. Special Cabinets, of course, can be designed to fit any unusual or special cleaning problem.

AMERICAN
FOUNDRY EQUIPMENT CO.
505 S. BYRKIT ST. MISHAWAKA, IND.

WHEELABRATOR



-does what other irons can't

WHEN no other iron will fill an unusual, intricate shape —or produce the high machinability, hard wearing surfaces or resistance to heat and acids demanded of certain castings—it's time to change to Chateaugay.

This low-phosphorus, copper-free iron "works wonders" in cupola and flask. It pours into dense, close-grained castings—even the toughest patterns—speeds up production, cuts foundry costs and increases profits.

And a Republic Pig Iron Metallurgist—who knows irons and foundry operations from A to Z—is ready to help you obtain maximum results when you use Chateaugay.

REPUBLIC STEEL CORPORATION
General Offices: Cleveland, Ohio

Berger Manufacturing Division • Culvert Division • Niles Steel Products Division
Steel and Tubes Division • Union Drawn Steel Division • Truscon Steel Company

REPUBLIC PIG IRON

THE MOST COMPLETE LINE OF MERCHANT IRON AVAILABLE

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus Copper-Free	(Northern) Basic, Foundry and Malleable	(Southern) Foundry and Basic

ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

THE FOUNDRY

EDITORIAL

Production for Victory Is Nation's Need

AMERICA, resolute in the battle for final victory, and intent upon conquering the forms of oppression, as exemplified by the Axis powers, will forever "Remember Pearl Harbor". The stupidity of the treacherous Japanese, shadowed so completely by their master minds in Berlin, has united the citizens of this nation as perhaps never before in history. An aroused people will share in the responsibility that belongs to all: will serve America wherever those in command may direct. From industry, the greatest need is "Production for Victory".

Castings are basic to any production offensive. In waging total war, the foundries of the United States will be called upon to render great service in the production of castings for the armed forces, and at the same time many sacrifices must be made by all companies within the industry. As the first objective the various branches of the foundry industry must speed the production of enormous tonnages of castings to be used for tanks, shell, guns, airplanes, ships, machine tools and other types of industrial machinery, trucks, railroads and many other war needs. During the past year as the United States prepared for war, foundry operations reached the highest point in history. But 1941 production will not suffice for the next 12 months, so that steps must be taken at once to solve the problem as quickly and as intelligently as possible.

Greatest pressure for immediate increases in production will occur in connection with steel castings, aluminum and magnesium castings for aircraft, brass and bronze castings for ship construction, and gray iron castings for machine tools. In the case of steel castings, war will place an additional heavy burden upon an industry already greatly expanded and operating almost entirely on war work. These new demands can be met only through construction of new steel plants or additions to existing establishments, by the conversion of some gray iron capacity to the production of steel castings, or by the substitution of gray iron, malleable iron or pearlitic malleable castings when proper study indicates these products will meet service requirements satisfactorily. Building new capacity requires time and the consumption of much needed materials. Conversion of facilities or substitution of product is not at all fantastic but does require the abandonment of numerous preconceived ideas on the part of both producer and consumer.

But the problem of producing castings in sufficient tonnages to meet the need of our rapidly expanding war machine does not rest entirely with the foundry industry. Government agencies including the Army, Navy, Air Corps, OPM and OPA must co-operate fully in the problem of metals procurement, or additions to the production facilities will become useless. For example, procurement of iron and steel scrap is the pressing problem of ferrous foundries. OPM has set the stage for action in combining the allocation of both pig iron and scrap under the capable guidance of William Kerber, who has done a splendid job for the foundry industry during the past four months in the allocation of pig iron. On the other hand OPA should awaken to the fact that its ceiling on iron and steel scrap not only is ineffective in controlling the price of scrap and is exceedingly unfair to the company, either buyer or seller, who is trying to operate within the letter of the regulation, but, most of all, is the fundamental reason behind the inadequate supply of this much needed material. After months of shortages, evasions and crackdowns, a realistic approach to the scrap problem is mandatory.

While certain types of foundries strive desperately to meet war demands, others, due to a variety of circumstances, today have little or no war production and therefore face an early shut down. The problem of civilian supply, an important issue prior to Dec. 6, was relegated to the background when the territory of the United States was invaded. War has first call on all metals, and it will be surprising if any remain for civilian use. Also, the time probably has passed when government agencies can take the lead in furthering subcontracting. The burden of obtaining war work now rests almost entirely with the management of the individual company. In this effort, subcontracting still appears to offer greatest possibilities to the vast majority of foundries seeking work.

Frank G. Steinebach

Editor

TURRET LATHE CASTINGS Must be Perfect

By PAT DWYER

SEVERAL years ago the Warner & Swasey Co., Cleveland, builder of turret lathes and huge telescopes, was seeking a source of supply for gray iron castings. The standards the company had set for its foundry work were more than ordinarily exacting, as befitted a product which had to emerge from subsequent manufacturing operations capable of being assembled with watch-like accuracy.

The average castings available left considerable room for improvement, in the opinion of Warner & Swasey engineers. Take, for example, the conventional semisteel mixtures of the high carbon, low silicon type used for cast beds, frames, and sliding members. Where the composition was adjusted to give a dense structure and high finish in the heavy sections, hard corners and edges frequently appeared on the lighter sections. When the mixture was adjusted to make the light sections more machinable, the heavy sections were not so dense as necessary

and the machine finish was not up to the desired standard.

These were typical of the kind of problems which called for experimental work—and a foundry organization capable of initiating and carrying the necessary research through to a successful conclusion.

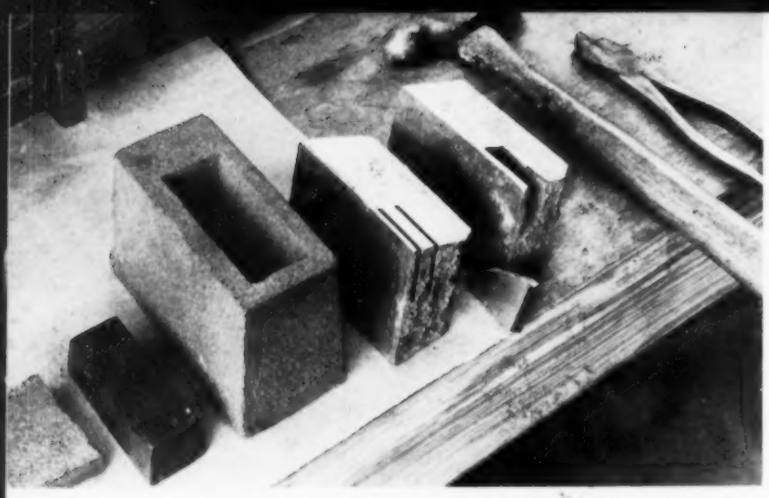
Working to the specifications required to produce superlatively good castings was not a new experience to the Sterling Foundry Co. of Wellington, O. They had done it to the satisfaction of other customers, averred Sam Hummell, general manager, and they were willing to tackle the job for Warner & Swasey.

To make a long story short, Sterling got a trial order. The first batch of castings was accepted. More orders followed—and steadily increased in size. Today practically the entire output of the foundry, 1500 tons per month are shipped to the Warner & Swasey plant in Cleveland, recently expanded to three times the former capacity as a result of the national defense movement. Obviously the foundry also has been expanded from time to time to keep pace with the constantly expanding demand for more and more castings.

Process of cleaning the castings has kept pace with other improvements and now has reached a stage where a final touch is given with a sheet of sandpaper. A section of the cleaning department where a group of young men is engaged in this final touching up performance is shown in Fig. 5.

Problem of the management on more than

Fig. 1 (Color) Casting end showing position of gates. Fig. 2 (Below, Left)—Casting lifted out of mold. Fig. 3 (Above Left)—Interior of the mold is formed with a large number of dry sand cores. Fig. 4 (Center Below)—Patterns with gates are mounted on boards. Fig. 5 (Right Above)—The cleaning room. Fig. 6 (Below)—Transfer car for the ovens



one occasion was to maintain full production in existing quarters and erect additions and install equipment in extensions to the building. A concrete mixer with all the accompanying disorder has been in practically continuous operation in one section of the foundry or another section for the past two years. The latest item of equipment to set up is a second sand preparation plant near the center of the foundry. The main feature of this plant is a muller of the latest type supplied by the National Engineering Co., Chicago.

The unit under push button control is almost completely automatic in operation and provided with equipment for the removal of dust and fines from the sand. From the shakeout the sand is carried aloft and stored in a bin. A device measures the exact amount for each batch in the muller, while auxiliary equipment measures the amount of binder and water. An air draft cools the sand as it enters the storage bin and a revolving cylinder catches the sand as it leaves the discharge chute, aerates it thoroughly, breaks up any cakes or lumps and leaves it in perfect condition for use by the molders.

During all the changes the original plan of moving all material from the north to the south end has been maintained. That is the sand and other raw materials enter the foundry at the north end and the finished castings are shipped from the south end. This has meant the relocation of the core room on the west side and relocation of the cleaning room and the movement of all the chipping, grinding and other equipment further to the south end.

Molds are made, cored, set up and poured in all the bays in the central part of the foundry. The larger castings are made in the two main bays where crane service is available. Smaller castings are made in a section of the west bay equipped with a battery of molding machines set close to the wall which in this instance is a continuous window, with hinged or swinging sections to promote and regulate ventilation.

This modern feature of light and ventilation has been given full consideration in the planning and erection of each addition to the original structure. Continuous windows in the roof of each new section provide ample light over the floors. The swinging sash promotes ventilation by creating a draft, particularly at a time when it is needed most, the period during which the metal is poured into the molds and later when the castings are shaken out.

The pattern shop and pattern storage are located in a building separated by a drive way from the north end of the foundry. All patterns are mounted on boards as shown by a typical display in Fig. 4. The boards are provided with pins to locate the flasks, a very important feature where part of the pattern is in the cope and part in the drag. Patterns for the gates form an integral part of the outfit and provide a clean firm passageway for the metal. This precaution is commendable even where experienced molders are employed.

It is a practical (*Please turn to page* 148)

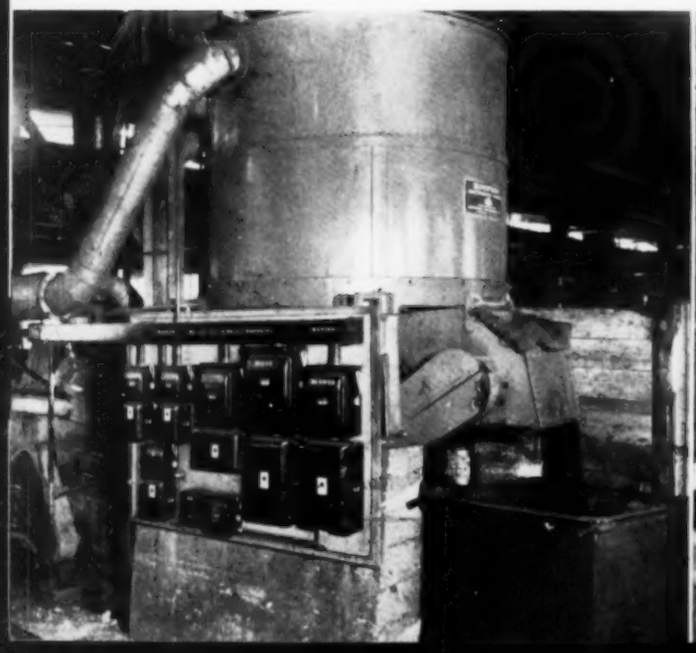


Fig. 7 (Upper Left)—A test piece is machined from the solid block to note structure and density. Fig 8 (Below Left)—The enclosed sand mixer is under push button control. Fig. 9 (Center Below) Smaller beds in green sand molds are set up, cored and cast in a side bay. Fig. 10 (Right Above)—Molds are made in stiff cast iron flasks flanged and ribbed and with an extension under one end. Fig. 11 (Center Right) — Before the castings are painted for shipment the surface is finished with sand paper. Fig. 12 (Below Right) — General view in the core making department

IMPROVING Cupola

THE CUPOLA differs from other types of melting furnaces in some very fundamental aspects. First, it is the only type of melting furnace which melts metal continuously and delivers this metal as it melts for immediate use. The blast furnace is a continuous type furnace, but it is not a melting furnace. Second, the cupola is a high speed melting furnace. It does not lend itself to comparison with any other type of melting furnace.

For example, one cupola used in the automotive industry, lined to 72 inches, can turn out over 17 pounds of metal per second, 1040 pounds of metal per minute, 1,000,000 (500 tons) pounds of metal in a 16 hour melting period. Third, the fuel and metal are in intimate contact from the time of charging until metal is tapped from the furnace. The quality of the cupola product and the economies of the process are associated very closely with this feature.

Cupola Has Wide Application

Main use of the cupola is to produce cast iron, though its use in the field of malleable iron is rapidly expanding. It is used in the field of insulating materials to make mineral wool, it is used to melt bronze, it is used to melt ferromanganese, etc. We are not interested here in its use other than for cast iron melting except as experiences from one field of application are beneficial to another. A reference to other uses of the cupola seems irrelevant but it is felt that a knowledge of its wide use may increase respect for the cupola.

Materials for the cupola that we buy or which management or the purchasing department buy at our request or force upon us are important. Those materials are coke, pig iron, steel scrap, refractories, fluxes, alloys and ferroalloys, etc. Their quality, size and form, cost and availability when needed are of importance to us and it is intended that the importance of the materials with which we work will have their rightful share of our attention.

If we were building a new foundry, we would need to consider the size of the cupola, the ability of the blower to deliver the required amount of air against whatever conditions the cupola imposed, the arrangement of the blower pipe and blast gate, the desirability of mechanical charging, the method of tapping the cupola, pressure gages and the various devices to meter or weigh air and to condition it for moisture or temperature. However, we are not building a new foundry but are taking over the equipment as is.

The cupola is an assembly of essential equip-

Performance

By DON J. REESE
International Nickel Co., New York

ment which in addition to the furnace itself must include a blower and a means of driving the blower, a pipe connection between the blower and furnace, a means of getting materials discharged into the cupola some 20 to 25 feet above the foundry floor level and a means of removing slag and metal away from the furnace.

It is essential that the blower be able to supply the required amount of air against the resistance to air flow presented by a cupola when this resistance is measured under operating conditions. A blower unit incapable of meeting those requirements means that cupola performance must be lowered to the level of the accessory equipment. Therefore, a blower that is engineered to meet fully all requirements is a definite aid in attaining the highest levels of cupola performance.

In addition to emphasizing the importance of the blower, it is necessary that the piping between the blower and cupola be air tight. In the author's opinion, a cupola pressure gage is essential to good operation. Such features as mechanical charging, air conditioning, preheating, air metering or control devices, etc., will be left out of the present discussion in order to spend more time on the more serious phases of the cupola process. However, those devices will not be ignored and will be referred to later.

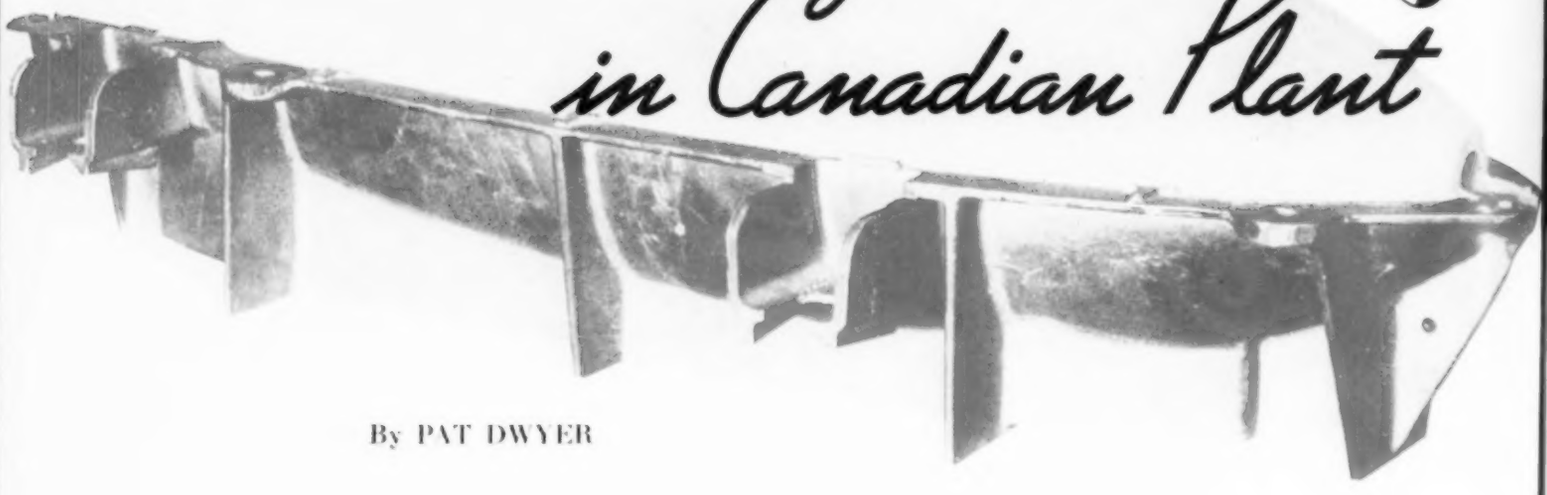
Materials Affect Costs

Assuming that we have reasonably satisfactory equipment with which to work—which is generally the case—and that we also have a satisfactory supply of materials, we first decide what type of cast iron we are going to need to suit our shop and then proceed to figure a charge for the cupola. Here is a good place to get started on the job of improving cupola performance. The various materials that we select for the charge have a bearing on costs.

Why have we figured the charge at 1000, 2000, 3000 or up to 10,000 pounds? We may have selected charge units in 1000-pound units because they are convenient units in calculating a charge or in weighing a charge, but the chances are not very favorable that they are the most suitable charge units for your cupola. In the author's opinion, the iron charge unit should be selected after the coke charge unit is selected and should be based on the fuel charge and the type of material in the iron charge.

The fuel charge of a cupola could be 9½, 9 or 8½ down to 7 pounds of coke per square foot of cupola area, which for a 36, 48 or 60 inch diameter cupola would be 65, 115, and 175 pounds of coke, respectively, for the coke charges of those cupolas. (*Please turn to page* 151)

CAST BOMB SHELLS in Canadian Plant



By PAT DWYER

IN THE December issue some features of a Canadian steel foundry engaged in production of bombs were described and this article will present further details. Silica sand for the molds and cores is imported from the Ottawa, Ill., district and stored in a building close to and on the north side of the foundry. From the storage pile it is passed through a long, oil fired revolving steel drum which removes all residual and accumulated moisture. Dried sand falling through a chute at the discharge end of the drum passes through a screen designed to remove lumps, gravel or other foreign material. For some time this roughage was wheeled away to the dump. Then one day the sharp eyed superintendent ever on the alert to cut a corner and save a penny investigated this waste material and to his surprise discovered that the lumps simply were small accumulations of sand grains held together tightly and temporarily.

An experimental batch thrown into the shakeout hopper rapidly disintegrated under the influence of heat and moisture. Thereafter the material formed part of the new sand added to the regular system sand at the shakeout to compensate for the usual foundry loss and to maintain the desired properties in the sand flowing through the mixer and into the molds. Close control is exercised over the sand in a well equipped sand laboratory where routine testing is carried on constantly throughout the day.

Four standard sand mixtures, *A*, *B*, *C*, and *D* are in use. *A* is the system molding sand pre-

Fig. 14 (Above)—The core is dried in a shell. Fig. 15 (Right)—The aluminum core box is in two parts jointed horizontally at the center. The assembly is hinged at one end and is moved to a vertical position to receive the sand. Inset, one half corebox

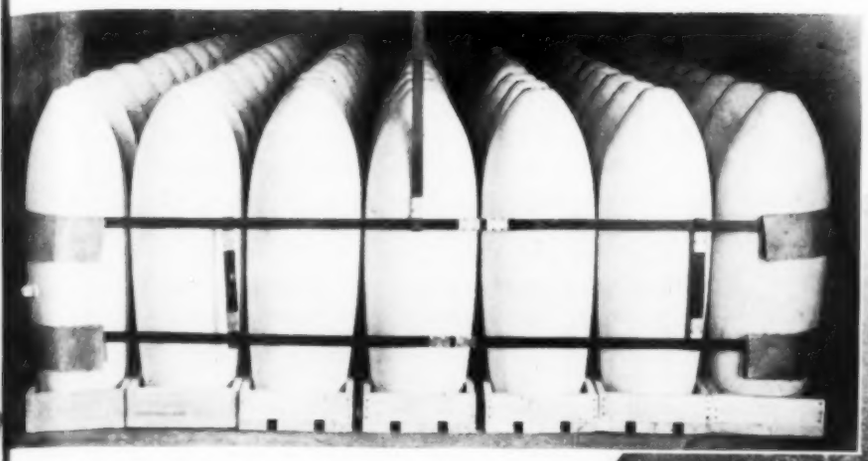
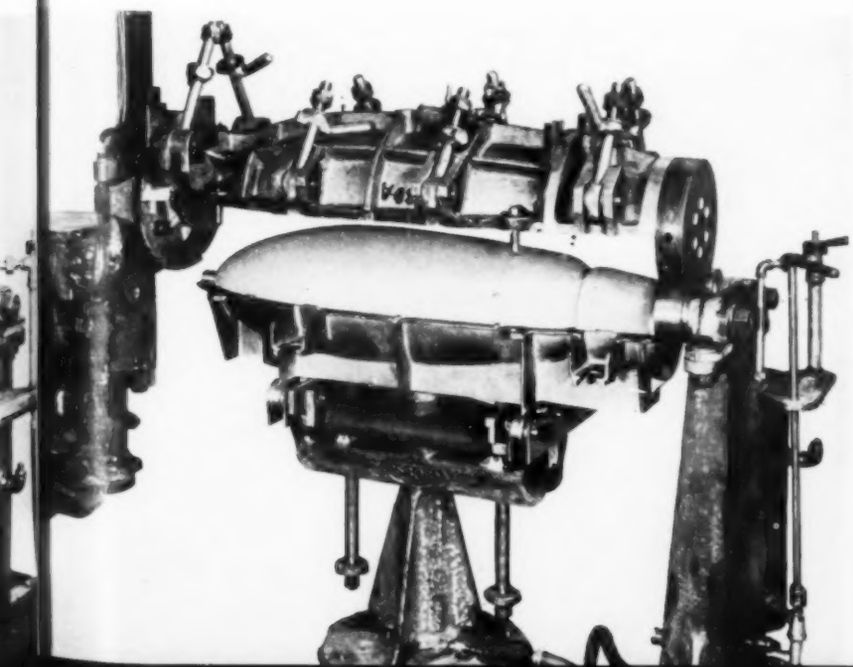
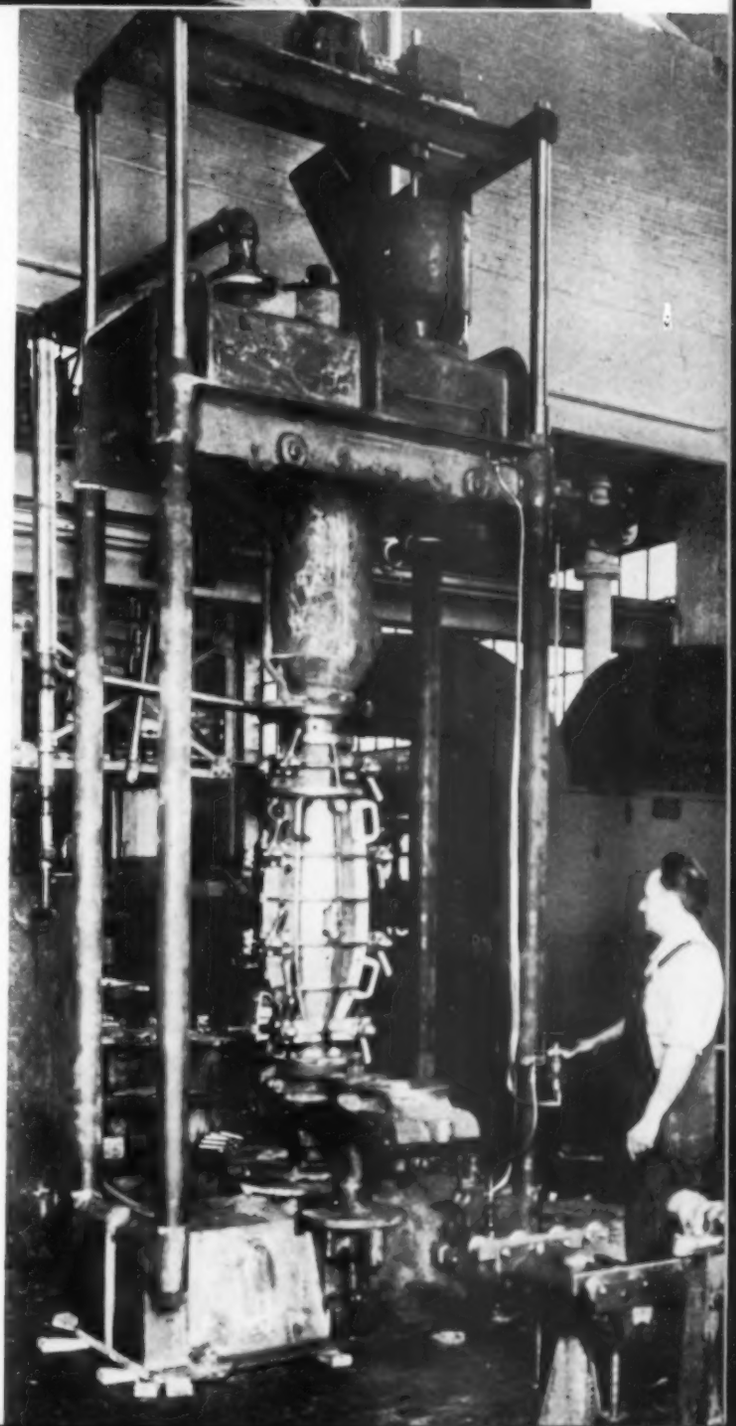


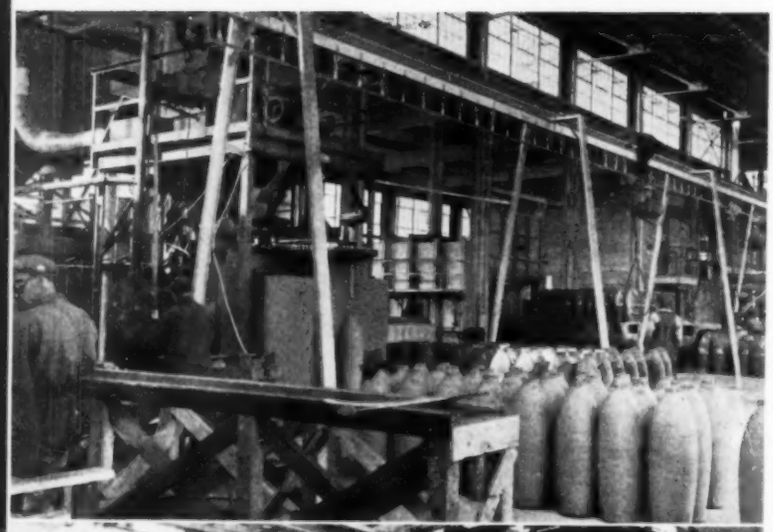
Fig. 16 (Above)—Finished castings strapped and braced are loaded and shipped in box cars.
Fig. 17 (Below)—The core supported by the dryer shell is lowered from the corebox.
Fig. 18 (Above Right)—Inside the shell is ground.
Fig. 19 (Right Below)—Corebox in blowing position

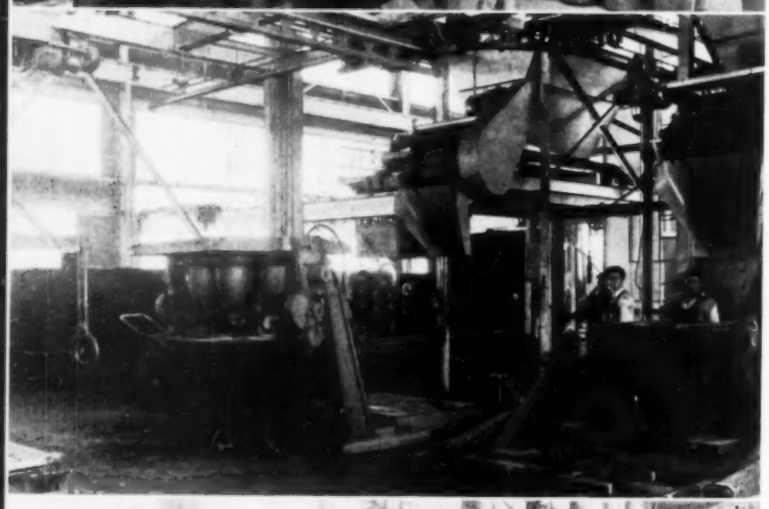
pared in batches of 2535 pounds, made up of 2450 pounds molding sand, 50 pounds silica flour, 16.4 pounds (2 imperial gallons) bentonite, 18.7 pounds (1¾ imperial gallons) revivo fire clay, water 10 to 20 gallons (U.S.) depending on temperature of the sand, new sand approximately 5.66 per cent added at the shakeout. The batch is mixed dry for ½ minute. Then the water is added and the mixing is continued for 3½ minutes.

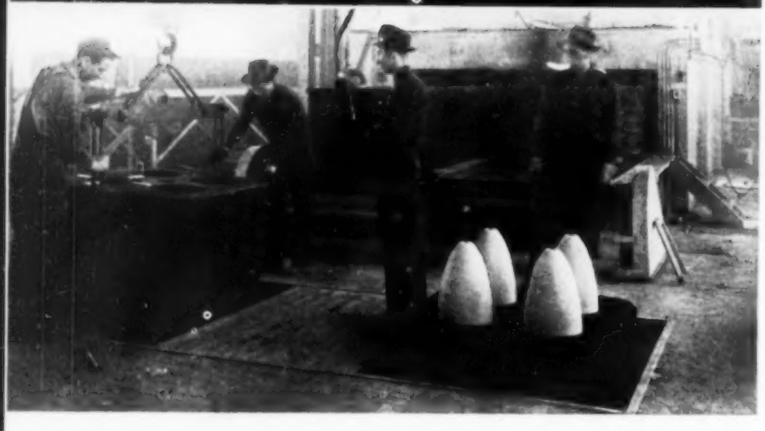
The resulting sand shows the following characteristics: Moisture 4.5 per cent minimum to 5.1 per cent maximum, permeability 120 to 220, green compression 10.8 pounds, dry compression 187.5 pounds, average deformation 35, green shear 2.8 pounds, dry shear 31.3 pounds, flowability 74, mold hardness 75.











The equipment represents the latest and most modern development for cleaning and screening the sand to remove metallic and other refuse, air cleaning to control the amount of fines, proper time in the muller and automatic aeration of the sand before it enters the hoppers above the molding machines. The sand is cooled in the storage bins so that it never is more than 10 to 15 degrees above room temperature.

A vertical spreader distributes the sand and a large stack draws air through the sand as it is cascaded into the storage bin. The volume of air may be regulated in conformity with the temperature of the sand. Sand from the shakeout is lifted by a bucket elevator and discharged into a storage hopper. A pan mounted under the hopper takes the exact amount of sand for a batch and delivers it to the muller. Automatic attachments regulate the addition of other ingredients and the mulling time.

Exercise Close Sand Control

Sand *B* for the bomb cores made on the core blowing machine is prepared in 1614-pound batches containing 1350 pounds silica sand, 250 pounds silica flour, core oil 1 to 30 by volume or 1 to 46 by weight, and water 6¾ gallons. In the smaller muller the batch is mixed dry for 1 minute, water added slowly for 1 minute and the batch is mixed for 5½ minutes. Then the oil is added slowly while the batch is mixed for 2 minutes. In this mixture the moisture is 3.8 per cent, permeability 45, green compression 5 pounds and deformation 35.

Sand *C* for the butterfly and well cores is mixed on the same cycle as sand *B*. The butterfly core forms the pointed end of the shell while the well core sits in the drag at the bottom of the sprue. The batch contains 475 pounds silica sand and 100 pounds silica flour, 1 gallon dry binder, 3¼ gallons core oil and 2½ gallons water. This sand with moisture 3.6 per cent, permeability 15, compression 4 pounds and deformation 38, is exceptionally refractory.

Special facing sand *D* for use around the gates is prepared in batches of 1324 pounds, containing 1050 pounds new silica sand, 300 pounds silica flour, 2¼ imperial gallons or 18.45 pounds bentonite, 2¾ imperial gallons core oil, 9½ gallons (U.S.) water. This is mixed dry for 1 minute and 10 minutes wet. The oil is added 5 minutes after the water. The mixture shows moisture 5.8 (*Please turn to page* 134)

Fig. 20 (Above)—Castings pass through a pressure blasting chamber. Fig. 21 (Upper center)—Molds are made on two rollover jolt machines. Fig. 22 (Lower center)—Heads are removed under a circular saw. Fig. 23 (Left)—Drags placed in a pit to receive cores

THE question of foundry floor has been discussed over and over again and there are probably as many different types of floor that have found favor with foundrymen as there are foundrymen. One foundryman will tell you that a concrete floor is dangerous since hot metal when spilled on it is likely to explode. Another will say that he prefers a molding sand floor because it insures a floor that does not contaminate the sand heaps by getting other than molding sand into them. Others will claim that brick floors are better and so on.

However, a foundry must have a floor and that floor must resist the many effects produced by the foundry operations from day to day—heavy trucking, abrasion of sand, hot metal spilling and all the other factors well known to the foundryman. The best foundry floor is one that is thoroughly dry. This means that if it is to be concrete the concrete must be laid so that there is a heavy sand bed under the concrete properly drained with tile to remove all moisture from under the concrete. If a brick floor is to be used it will be well to lay a waterproof concrete base underneath the brick and then use a good grade of thoroughly vitrified paving brick on top of the concrete base set on a thin dry sand bed on the concrete and cemented together with a good portland cement grout. Such a floor will stand foundry service very effectively unless extra heavy castings are to be produced.

In that case the castings will presumably be made in pits in the floor and consequently the floor must be a sand floor and preferably this sand must be molding sand. Beneath this molding sand drainage should be adequate. On that account the location of the foundry should be considered from the standpoint of what the drainage conditions are. If this foundry is to have a heavy molding bay that should be located preferably in that part of the available property which is assured of thorough drainage far below the surface of the land. Consequently, when deep pits are to be dug in which to make molds the pits will remain dry and free from any seepage moisture or any tendency for moisture to seep in.

In planning the foundry the engineer easily can make a survey of the available land and determine that part of it which is best suited to this type of a molding bay for heavy work. In the furnace department the floor is another problem from that of the foundry. In the first place there are hot crucibles to be set on the floor and many other hot things will contact with the floor. Therefore, it must be something that is affected little by elevated temperature. One very satisfactory furnace room floor is the imbedding cast iron plates into the concrete, which is properly drained underneath. The plates have surfaces scoriated to avoid slippage by the men walking and handling metal on these plates.

Such a cast iron floor is expensive in first cost but lasts a lifetime with no maintenance charges and practically no trouble whatsoever resulting from the dropping of heavy pieces of metal thereon or the effect of hot crucibles and hot tongs and the like. However, during this period of defense production cast iron is probably out of the question as is other metal for floor plates. Consequently the use of a hard easily renewable paving brick laid on top of a concrete base will give excellent service in the furnace room and will resist erosion by the trucks delivering the charges to the furnaces and at the same time be hard to score by the dropping of sharp objects on it. Such a floor will also give no trouble when hot crucibles are set on it or hot pieces of metal.

The aisles of a foundry are the places where the heavy duty takes (*Please turn to page* 145)

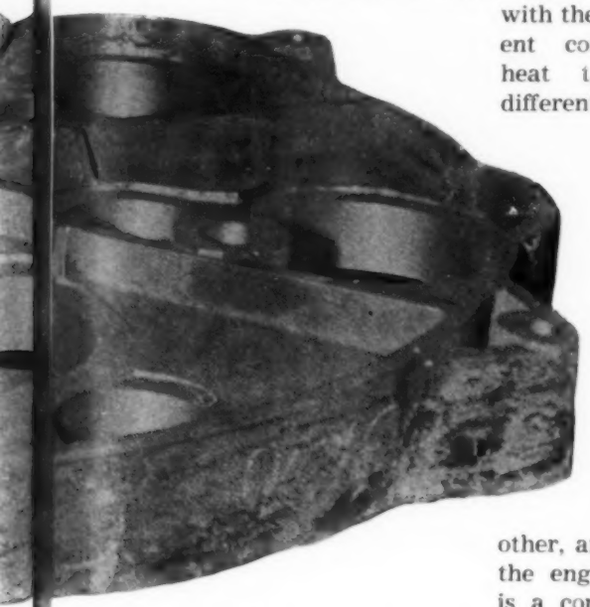
Above—Quality in production of steel requires constant control and research. OEM Defense Photo by Palmer. Right—Putting the finishing touches on a casting. OEM Defense Photo

Recent Developments in CAST METALS

By C. H. LORIG
Supervising Metallurgist
Battelle Memorial Institute, Columbus, O.

JUDGED by any standard, the foundry industry has made remarkable progress in recent years. This springs from that characteristic and everlasting desire in our industrial life for improvement, for doing new things, or for doing old ones better. Scarcely anything we believed was permanent in industry has been lasting. Much has happened that we were taught to believe was impossible. Technical changes, which are affecting our industries in no small way, have permeated the foundry industry, and it is to review some of the recent technical achievements in your industry that this article was prepared.

Gray cast iron is, as pointed out by Schnee, (1) one of the best known and least understood of the common materials of construction. Quoting Schnee, "One reason for this is that 'cast iron', like 'steel' is a general term used to designate not one, but a class of materials. These include the soft, weak irons, sometimes used for sash weights, the hard and brittle materials formerly used for stove plates, the machinery irons and at the other extreme the irons used for cast crankshafts and the like, having the strength of steel along with considerable toughness and ductility.



"In the case of steel, engineers are familiar with the fact that different compositions and heat treatments give different combinations of strength, toughness, and allied properties. Usually, unless the cost can be considerably increased, a gain in one property is offset by a loss in some other, and in every case the engineer's selection is a compromise. Similarly, in gray iron, changes in composition and foundry practice result in a gain in some properties and a loss in others, costs remaining the same.

"But for every engineering use there is, somewhere along the line, a most suitable and economical grade of cast iron. Making the necessary compromise is the joint responsibility of the purchaser, who knows what properties are most important in his particular service, and of the foundryman, who knows what adjustments can be made in composition and melting and finishing practice to strengthen those properties of the iron.

"If the user who needs the utmost in a combination of properties, say that of compressive strength and damping ability or torsional strength and notched endurance, or high modulus and machineability, or low modulus for tight press fits and high tensile strength, or some other special combination, will explore the possibility of attaining a good compromise rather than a poor one, he might effect surprising and welcome economies. The road to this, of course, is a study of the properties of different gray irons as shown by specific tests which appraise the desired properties."

Attainment of a good compromise in the properties of cast iron for a particular service is made possible by the fact that within the industry standards of work have improved remarkably. It is no longer so difficult to foresee what is needed and, hence, the pattern, the structure and the composition of cast iron, so far as present day metallurgical and engineering knowledge will permit, to fulfill these requirements. Control, of course, makes this possible.

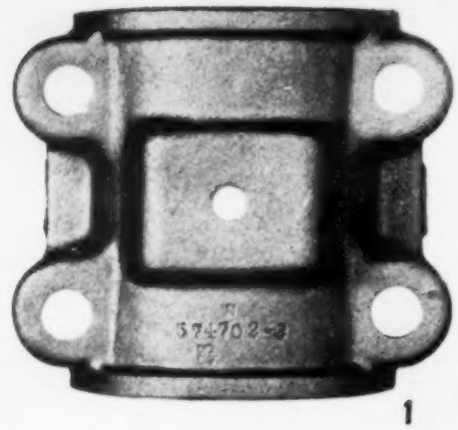
Select Proper Raw Materials

Control begins with good housekeeping. Great strides have been made in improving supervision, metal materials, sand handling, and the general working conditions in the foundry. These improvements are reflected in the tremendous advances in the technique of gray iron manufacture in recent years.

Equally great strides have been made in the application of metallurgy to the production of cast iron; the modern producer is adopting methods which put his product under good metallurgical and technical control. The economy and advantages and, therefore, the increased necessity for metallurgical control are quite evident to those who are in the business.

The manufacture of good iron begins with the selection of raw materials and the most effective utilization of these materials. Metallurgical control has taught that the best results not necessarily are obtained with either cheap or expensive materials but that a full knowledge of how to use them is of prime importance. In the case of pig iron, there are some who have little reason to believe that certain inherent qualities of iron survive as far as the tap hole, while others feel strongly the other way.

In any case, such inherent qualities are masked easily by other factors that come up in melting. Because of this, metallurgical control has made it easier for the producer to adopt his practice to the use of materials that may be close at hand and (*Please turn to page* 159)



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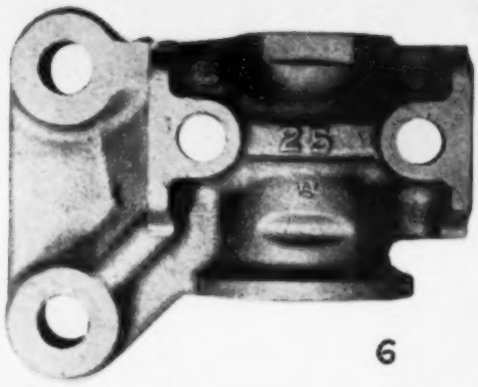

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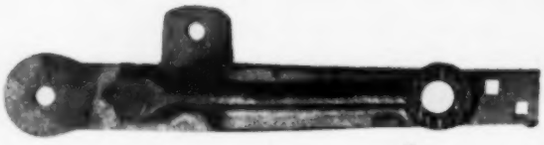

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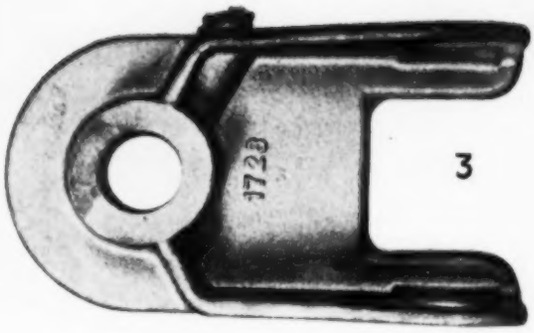


3

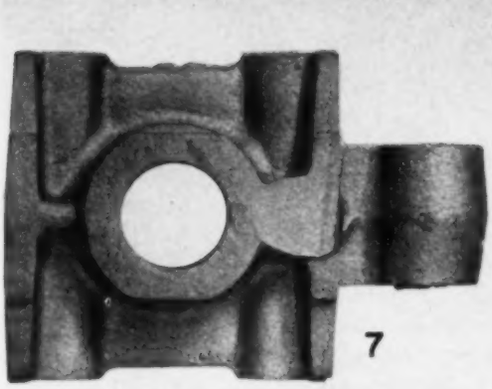
Gating and Molding

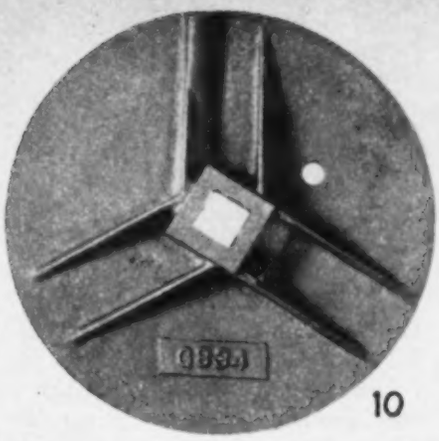
MALLEABLE

FIRST step in proper gating and molding practice is a thorough study of the blue print before ever making up the master pattern. This should be given plenty of thought to be sure the pattern is designed properly for malleable iron. As you know, we have all had patterns from which it was impossible to make castings free from shrinks and cracks without redesigning. Before making a pattern we should study the print thoroughly as to design for practical molding, and the possibilities of eliminating shrinkage, and cracks without going to an extreme with feeder bobs, cracking fins, tunnel cores, risers, extra sprue, chills, etc.

In the author's opinion a pattern properly designed will eliminate 90 per cent of the foundryman's trouble. Parting lines are very important. Addition of fillets and even distribution of metal, if the customer will permit it, always should be considered. In many instances we have taken metal from a heavy section and added to a lighter section without increasing or decreasing the weight. Resulting castings were much stronger and misruns, cracks and shrinks were eliminated.

Pattern layout is just as important as having a pattern properly designed. Before we make our layout we must first decide where we are going to gate. Then layout the pattern properly spaced, bearing in mind that ample space for the feeder bobs must be provided; also sufficient space between patterns for sand to pack, but





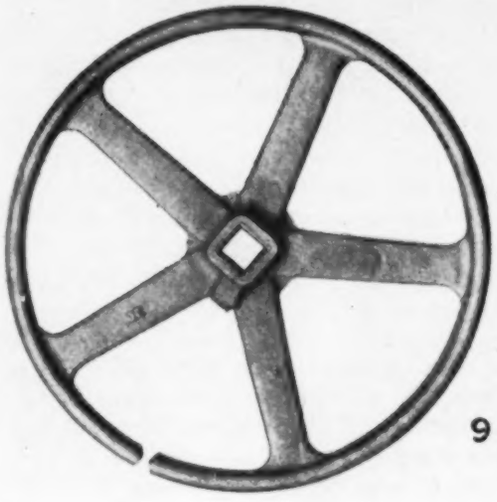


Fig. 1—Automotive casting which showed shrinkage across the top just above the four cored holes. Fig. 2—Wheel fork with rib built up to feed heavy section. Fig. 3—Fillets were necessary to feed hub. Fig. 4—Built up ribs and added fillets on casting shown in Fig. 1. Fig. 5—Heavy fillets feed bosses. Fig. 6—A 15-pound casting required pattern changes. Fig. 7—Same casting with built up rib at gate and increased gate. Fig. 8—Foot pedal. Fig. 9—Cut in rim and heavy fillet into hub decreased loss to low value. Fig. 10—Anchor base. Fig. 11—Wheel fork casting weighing 25 pounds. Fig. 12—Automotive spring shackle which required heavier fillets and cross fillet to eliminate shrinkage

E CAST IRON

By C. C. LAWSON
Wagner Malleable Iron Co., Decatur, Ill.

no more in either case than actually needed.

In spacing, consideration must also be given to deep draws in either cope or drag, irregular parting lines, etc. Flask sizes are not so important unless we go to extreme sizes causing the cope to drop or sag, or exceed the molder's ability to handle.

Time and thought on layout and gating is money well spent. The efficiency of a molder all depends on what he has been given to work with. If you give him a hoe for a shovel, you wouldn't expect much. Then why expect any more if he has a pattern you know isn't properly designed? We would have a lower efficiency in either case.

We all agree it would be much more profitable from a company standpoint to give him a hoe. At least the hoe would not result in money spent for sand cutting, pouring, shift and dump, casting breakers, cleaning, inspection, annealing, grinding and freight both ways if the casting failed due to internal shrinkage or something else which showed up after machining.

During the author's experience as a molder, the most disturbing and disgusting thing to him was to have a large pile of scrap to look at and have everyone else see, even though it was no fault of his. Patterns improperly designed, poor judgment in gating, not enough draft, deep pockets with no fillets, thin ribs so far from a gate they were impossible to run, spacing so close together the sand (*Please turn to page* 156)

Hemisphere Cooperation TO FEATURE WAR CONGRESS

RECOGNIZING the increasing attention given by Central and South American foundries in the work of the A.F.A., and the accelerating importance of foundry work in all the Americas, the Board of Directors of the Association is designating the 1942 Convention to be held in Cleveland on April 18 to 24 as "The First Western Hemisphere Foundry Congress," inviting attendance of all foundrymen of this hemisphere, with the Canadian and U.S.A. members as hosts.

In connection with the Congress, a major Foundry Show will be staged with particular attention given to war production efforts on the part of foundrymen. Government departments and the Army Ordnance Association, with some large industrial organizations, are backing a "Special Ordnance Exhibit," a major feature of the foundry show to be held in Cleveland Exhibition hall. Ordnance material to be displayed will be arranged to show possibilities of parts to be produced as castings. Advance reservations from foundry equipment and supply firms for space indicate that the show will be outstanding as compared to any of recent years, with space requirements taxing the exhibition hall, one of the largest in the country.

Sessions for the congress are being planned by a large number of committees of the association. As in the show, attention will be directed to war problems facing the nation and the industry. Altogether, some 50 sessions will be arranged for the convention days with all branches of the industry represented and provision made to discuss the problems of the manager, metallurgist, engineer and shop in each branch.

Program committees have developed a schedule of sessions which will make the meeting one of the most valuable in the association's history.

Management problems of foundry operations will be stressed through sessions on training personnel, foundry cost methods, safety and hygiene, plant and plant equipment and job evaluation and time study. In addition, each day special talks will be on subjects relating to war problems by outstanding men from the government departments. These meetings will be a feature of the convention and will bring to those attending the latest developments in war production.

Metallurgical developments will be stressed in some fifteen sessions, these being (*Please turn to page* 143)

Below — Terminal Group at Cleveland. Photo Courtesy Convention Bureau. Left, photo courtesy U. S. Army Signal Corps

QUESTIONS and ANSWERS

Need Good Venting in Jacket Cores for Motor Blocks

We are not quite satisfied with the cores in our automobile cylinder water jackets. We shall appreciate a suitable formula.

Here in the Middle West cylinder water jacket cores are made from a clear, fine grain sharp sand bonded with oil. If you are using this mixture at present and are not quite satisfied it is possible the source of the trouble may be in the size, position and number of vent wires. In your place we should give this feature a pretty close inspection and check up. The proportions of oil, water and sand, also baking temperature are items worthy of close attention. The sand of course should be perfectly dry in the raw state to insure a uniform product. The usual mixture contains 1 part oil to 40 parts sand with water between 7 and 9 per cent. The cores are baked thoroughly at a temperature of approximately 375 degrees Fahr.

Coke Splits Used in Small Size Cupola Cause Trouble

Our cupola lined to 20 inches inside diameter is provided with six tuyeres 3 x 6 inches 8 inches above the sand bed. The slag hole is 2 inches below and between two tuyeres. Blast is supplied by a blower 24 inches diameter running at 3850 revolutions per minute and discharging through a 5-inch diameter pipe into a wind belt 4½ x 14 inches. Pressure is maintained between 7 and 8 inches in a water gage. Each iron charge is made up of scrap auto cylinder blocks and heads mixed with return scrap, sprues and gates. The charge is 190 pounds iron and 25 pounds coke with 3 to 10 pounds clam shells for a flux. The first few taps yield about 300 pounds each, but after the blast has been on about 40 minutes the amount decreases. By the time we melt about 2 tons, which takes 2 hours we get only 60 to 70 pounds to a tap. After dropping the bottom we find the cupola choked with slag in the well and to a point well above the tuyeres. We have a great deal of trouble trying to keep the slag hole clear.

You are blowing in more air than the limited amount of coke will consume. In other words instead of promoting combustion, you are blowing out the fire. A 20-inch diameter cupola has a normal melting capacity of approximately 3000 pounds of iron per hour with a consumption of 325 pounds of coke and a blast volume of 700 cubic feet per minute. Your present blower is rated to deliver the correct amount of air, but the skimpy volume of coke does not supply enough carbon to unite with all the oxygen in the blast. As a result, the cupola is filled with unconsumed air which acts as a chilling agent.

More care is required in operating a small cupola. than in operating one of larger diameter. The charges of coke and iron must be uniform and the amount of coke must be calculated to unite with a given volume of blast in a given period of time. For this purpose the bed must be maintained at a proper height and the charges of coke must be proportioned to maintain that height. Experience has shown that a coke split 4 inches thick is about right. In your case 25 pounds of coke, about one good scoop or forkful, is not enough for a 4-inch layer. Raise the coke to 40 pounds and the iron to 300 pounds with 15 pounds clam shells. Break the scrap into small pieces.

Wants To Make Thin Section Castings From All Scrap

Is it possible to produce radiator castings from all scrap cupola charges. What is a practical method to follow in adding silicon or other alloy. Is there a device for adding the alloy in the spout or is it preferable to incorporate the alloy material in the cupola charge.

Satisfactory castings can be produced from an all scrap charge *provided* care is taken in the selection of the scrap and suitable alloys are added to insure analysis similar to that of the iron produced when pig iron formed part of the charge. Ferrosilicon or ferromanganese or both may be added in powdered form at the spout, or in larger lumps in the cupola charge. These and other alloys are available in briquet form which also are placed in the cupola. A short article on the subject of adding alloys in a mixer type of spout, was published in the June, 1939 issue of THE FOUNDRY, page 98. Presumably you are familiar with the fact that the silicon content controls the hardness of the iron. Also that the hardness increases with reduction in thickness of the castings. Thus for example an iron readily machinable in a 1 or 2-inch section, would be too hard to machine in a ⅛-inch section.

Cores Drop When Set Up On End

A core we are making 13¼ inches in length and 7 inches diameter on the slightly tapered body between the end prints, sinks and becomes distorted to some extent in the oven. The core is made in a 2-part corebox and set up on end for drying. We shall appreciate information on a proper core sand mixture, also on how to prevent the cores from sagging.

The core sand mixture can vary to a considerable extent without affecting the utility of the core, but the mixture is only a minor factor if any in preventing distortion of a high core with two heavy projecting members on opposite sides. If the extent of the order warranted the expense, the proper method of making the cores is to roll them horizontally into dryer shells before they are placed in the oven. On a short order a temporary wood frame filled with molding sand will serve the purpose. After the core is rammed the drag half of the corebox is removed. The wood frame is set in place and filled with molding sand.

The plate is clamped in place and the entire assembly is rolled over. The upper part of the corebox is removed. The wood frame also is removed and the supported core is placed in the oven. An alternative method in which no dryer is required and by which the core can be dried on end as at present, is to place an upright arbor in the center of the core to carry the weight. This arbor is a section of steel pipe approximately 3 inches in diameter and 13 inches in length, or ¼-inch less than the length of the corebox. Vent holes ¼-inch diameter are punched or drilled about 1 inch apart all over the pipe. Assuming that the corebox is open at both ends and also at the two side windows, four 4 inch nails are inserted in each window, one at each corner. If the windows are not open, four holes can be drilled for insertion of the nails. A typical core sand mixture might contain 60 parts sharp sand, 20 parts new molding sand, 1 part core oil, 2 parts cereal binder.

Wants Book on Lost Wax Process

Where can I get a book on the perdu method of molding and also a foundry dictionary.

So far as we are aware no book has been published on the so called *Cire-Perdu* or lost wax process of molding. This applies of course only to the English language. It is possible that a treatise has been written in French or Italian. In these countries the process is practiced more extensively than in Great Britain or America. The process has been described on several occasions in THE FOUNDRY in descriptions of foundries engaged in the manufacture of statuary and ornamental bronze castings.

Briefly, a clay model is prepared by the sculptor. Plaster is built around the model either in one piece or in sections depending on the size. The plaster mold is removed from the model and the clay is taken out. The inside of the plaster mold is painted with vaseline. A small mold is filled with molten wax. When a shell of wax has developed the approximate thickness of the casting, the remainder of the wax is spilled out. On large pieces the thickness of wax is laid on in the form of wax sheets. Odd and difficult places are built on by hand. In either case a core is built up inside the wax. The entire mold is placed in an oven. In large pieces a fire is built inside and then all the wax is melted out. The mold then is secured either in a flask or in a pit and filled with metal. The description sounds simple, but the work requires a high degree of skill and knowledge only gained through experience. An international foundry dictionary was compiled a few years ago. A copy may be ordered through the American Foundrymens Association, 222 West Adams street, Chicago.

Cut Down Riser on Propeller Hub

We have a large order for semi-steel four-blade propellers, 15 feet diameter, weighing 15 tons each. The hub has a section 10 inches thick and the blade varies in thickness from 10 inches at the hub to 1½ inches at the tip. We have cast one and extended the hub 18 inches for a sink head. We shall have to remove this extra metal by drilling holes and wedging it off, an expensive item. Is this method of feeding the one usually employed on large wheels. Analysis of the metal showed: Silicon 1.42 per cent, manganese 0.89 per cent, sulphur 0.09 per cent, phosphorus 0.43 per cent. Any suggestions on modern practice will be highly appreciated.

The practice of extending the hub to serve as a riser on large propeller is observed in bronze and steel foundries, but is not necessary on gray iron or the so-called semi-steel castings. The top of the hub is fitted with a suitable flat, circular core print. When the mold is assembled a circular, flat core is placed in this print. The core is about 2 inches thick and has an opening in the center which fits around the tapered top of the hub center core. At one point the core has a 6-inch opening. The opening is flared out to 9 or 10 inches on the upper side.

A riser block from 10 to 12 inches in diameter is placed over the opening and sand is rammed to a height of approximately 12 inches.

(*Concluded on page* 76)

GANGWAY! By J. A. Patterson

"Every other one's a cigar, Boss—Hapgood got married."

Gathering, editing and distributing INFORMATION for users of alloys

To aid users of Nickel alloys, thirty service centers are maintained in industrial areas. From these strategically located key points, our field representatives are on call to advise American industry about the selection, fabrication and uses of ferrous and non-ferrous materials. Assistance is also given on problems arising from the temporary lack of Nickel.

Through the years, research, field studies and user experience have all contributed to a fund of practical, time-proved information. Many of these data have been compiled in convenient printed form, useful both to experienced men handling new materials or performing unfamiliar operations . . . and to the many new employees.

Now . . . when minutes and materials are so vital . . . make full use of this metal-working experience. Send for a check list of helpful printed pieces on the selection, treatment, fabrication and use of Nickel alloys, or send your specific questions to:

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.

(*Concluded from page* 74)

When pouring the casting the stream of metal is cut just as the first metal appears in the riser. The remainder of the riser then is filled with piping hot metal from another ladle. The top is covered with silocel, blacking, dry sand or any other nonconductor of heat. No necessity exists for using a feeding rod. The approved method of gating large wheels is not through the hub. A number of pop gates is set up on each blade from 1 to 2 feet away from the tip. Size and number depend on the size of the wheel. In the present instance we suggest four 1-inch diameter pop gates on each blade. They are spaced 4 or 5 inches apart and all are fed from a special cross shaped pouring basin. The gates are readily knocked from the castings. The riser is nicked at the junction and then knocked off with a sledge hammer. Incidentally, we wonder if you are familiar with a remarkable time and labor saving method for propeller molding developed during the previous war and described in the June 1, 1921, issue of THE FOUNDRY.

Use Wood for Fuel In the Cupola

In our country, Uruguay, all coal and coke is imported from abroad. Under present conditions the supply is restricted with prospect of complete stoppage. We have a small cupola in which the charge is 100 kilograms (220 pounds) iron and 10 kilograms (22 pounds coke) and on the last charges 2 kilograms (5 pounds) iron wood known in this country as coronilla. This wood is used quite extensively for making a strong charcoal. We shall appreciate your opinion on whether the wood or the charcoal should be used in the cupola; what percentage of wood can be used with safety; in the event of all coke supplies failing can we operate on wood alone in the bed and between the iron charges.

So far as we have been able to gather from the written record, wood in the natural state never has been used as a fuel either in the blast furnace or cupola. Charcoal was the universal fuel employed for many centuries until anthracite coal and later coke was introduced in the early years of the past century. Dr. Moldenke in *Principles of Iron Founding*, refers to an instance in Sweden where a foundryman operated a small cupola on charcoal. The process was too expensive. From 50 to 60 pounds of charcoal were required to melt 100 pounds of iron. Charcoal used in European and American blast furnaces and foundries was made from hard wood indigenous to the northern hemisphere.

We have seen no literature dealing with early smelting of iron ore or iron in South America. It is possible or rather probable that charcoal made from iron wood might serve more satisfactorily than northern wood. We are not in a position to offer an opinion on the use of the iron wood in the natural state. Obviously to promote combustion and realize the full fuel value, the wood must be divided in to small pieces corresponding to the size of charcoal or coke. Under the circumstances we see no way to decide the question, except by a series of experiments. A great deal of useful information on the construction, operation and maintenance of the cupola is contained in *Melting Iron in the Cupola* by J. E. Hurst.

Flux Used To Clean Aluminum Scrap

We are starting a pattern shop for the production of wood and metal patterns and metal match plates. We shall appreciate information on what material is used to liven or clean scrap.

Under present emergency and priorities conditions your question is more of an academic than a practical character. If you cannot secure aluminum, the method of cleaning the metal should be decidedly unimportant. The only establishments allowed to purchase aluminum are those engaged in the production of castings connected in any manner with national defense. However, if and when you have a supply of aluminum scrap you will be faced with many difficult factors in addition to securing clean metal for pouring the castings. In former years the great bulk of aluminum castings was made from a plain alloy containing 92 per cent aluminum and 8 per cent copper. In recent years an almost endless variety of alloys has been developed.

The subject is too extensive, too intricate and too complicated for discussion in the brief space at our disposal. A discussion of fluxes is included in *Metallurgy of Aluminum and Aluminum Alloys* by R. J. Anderson. Touching on the use of flux the author states that many fluxes have been used in melting aluminum alloys for the purpose of cleaning the bath and freeing it from entangled foreign matter, principally dross. Zinc chloride normally is used in amount from 0.02 up to 0.25 per cent by weight of the charge. It is added after the metal is liquid and about ready to be poured. Ammonium chloride, commonly known as salammoniac also is used to a small extent, also cryolite, sodium chloride, fluorspar and borax. Some firms produce proprietary fluxes for the purpose and it is suggested that you consult the advertising pages of THE FOUNDRY for their names.

Stamp Mill Shoes Shrink on Top

We shall appreciate your advice on the best method for molding stamp mill shoes to secure clean, smooth, solid castings. We have tried them in open and closed molds. In the closed mold the casting was gated into the neck at the bottom, and provided with a feeding riser in the center of the top. In the open mold the metal was poured directly into the mold. In both instances the working face of the casting was shrunken and irregular in contour. What is your opinion of the mold shown in the accompanying illustration?

Stamp mill shoes are poured from hard or white iron which shrinks faster and to a greater extent than ordinary gray iron. Molding is facilitated by casting the shoe in the position shown in your sketch, but unless a special technique is employed the working face of the shoe will not be satisfactory. A good, open grade of molding sand is necessary, but the mold does not require the elaborate venting arrangement shown in your sketch. Two methods are employed for molding these castings. Each has advantages and disadvantages. In one the working face of the casting is molded in the bottom of the drag.

This is in accordance with approved foundry practice. The neck is molded in the cope and an expanded addition to the neck serves as a feeding riser. However this riser must be fed with a rod and this may introduce an awkward situation where many castings are on the floor at the same time and the number of available men is limited. The method has been in use for many years and produces satisfactory castings where the feeding rods are manipulated intelligently and where additional hot iron in small quantities is supplied as required.

In the second method the casting is molded working face up and does not require any rod feeding. Instead of the ordinary cope, the mold is covered with a dry sand core which forms a basin to hold the feeding iron. The bottom of the basin core grows gradually thinner toward the center until it is only about ½-inch thick around the small opening in the center. This opening serves for gate and riser. After mold and basin are filled the upper surface of the iron is covered with some insulating material, charcoal, blacking, ashes, etc.

Experience Counts Today!

SPRING - MOUNTED ROLLER CONVEYER HANDLING 20,000 POUND MOLDS

MATHEWS ENGINEERS *have it!*

● Mathews Engineers, experienced with Foundry conveying problems, stand ready to work with you on the problem in your plant. Regardless of the size of the loads involved, 100 lbs. or 10 tons, it is a job for Mathews. Consult the engineer in your district. You may benefit by his experience.

INCREASED CAPACITY FOR NATIONAL DEFENSE

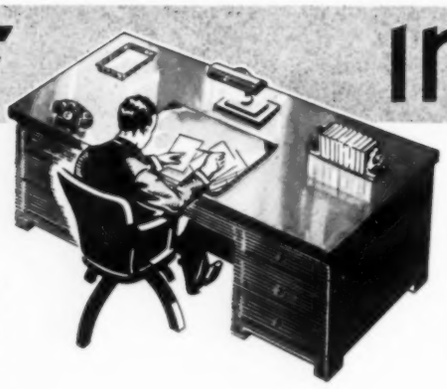
Our plant capacity has been increased over 65% to care for the rising demands of the National Defense Program — plus the normal demands of peacetime production.

All orders, whether subject to defense priorities or not, are given the same helpful care and attention that have always marked our dealings with prospects and customers in the past.

MATHEWS CONVEYER COMPANY, ELLWOOD CITY, PENNA.

FIELD ENGINEERS AND SALES OFFICES LOCATED IN 30 INDUSTRIAL CENTERS

MEN OF INDUSTRY



ARMAND T. CHANDONNET, for the past three years manager and treasurer, Elmira Foundry Co. Inc., Elmira, N. Y., an affiliated company of General Electric Co., has been appointed co-ordinator of aircraft turret manufacture in all General Electric plants. N. HAROLD BOARDMAN, an employe of the Elmira foundry since 1917 will succeed Mr. Chandonnet as head of that company.

Mr. Chandonnet is a native of Manchester, N. H., and was graduated from Tufts College in 1924 with the degree of bachelor of science in civil engineering. Following his graduation he entered the employ of General Electric through the business training course, and subsequently filled positions in the company's accounting and cost departments at Schenectady. He later served on the staff of the General Electric vice president in charge of manufacturing, handling special assignments. In October, 1935 Mr. Chandonnet became secretary of the manufacturing committee, a position he relinquished in January 1938 when he was appointed assistant manager of the Elmira Foundry company. A year later he became manager and treasurer. Mr. Chandonnet in his new position will make his headquarters in Schenectady.

Mr. Boardman, born in Amenia, N. Y., was graduated in 1916 with the bachelor of science degree in forestry from Syracuse University, where he specialized in science. He entered the employ of the Elmira Foundry company in April 1917, as a learner in the molding department, and a year later took charge of the melting department and development of the laboratory. He later became metallurgist of the foundry. In 1935 Mr. Boardman was transferred to the Elmira Foundry company's conveyor department in the position of general foreman and metallurgist. In the early part of 1941, in addition to his duties as metallurgist, he became assistant to Mr. Chandonnet and was appointed superintendent of the company in November, 1941.

* * *

ALLAN CUNNINGHAM has joined the National Smelting Co., Cleveland. Included with his duties will be the handling of priority matters for the company.

* * *

G. M. HENDERSON has taken over the duties of assistant to the general purchasing agent, American Brake Shoe & Foundry Co., New York, succeeding W. E. Sault, who died recently.

* * *

T. I. PHILLIPS has been elected a vice president, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Mr. Phillips started with the company as a tool maker in 1915. In 1930 he was appointed manager of the works department at the Nuttall plant of the company. Three years later he was made works manager for the company to serve as control authority for all manufacturing operation. His appointment as assistant to the president, in charge of a headquarters manufacturing staff and supervision of several important divisions of the company, was made in February, 1941.

* * *

WILLIAM S. SHIPLEY, chairman of the board, York Ice Machinery Corp., York, Pa., has been awarded the distinguished service award of the American Society of Refrigerating Engineers, of which he is a past president, for his effort in developing the successful York plan, a co-operative plan for co-ordinating the community's civic and industrial activities in the interest of national defense.

* * *

W. R. BEAN, vice president, Whiting Corp., Harvey, Ill., has been appointed Chief, Foundry Equipment and Supplies unit, Tools and Equipment section, Office of Production Management, Washington, succeeding FRANK G. STEINEBACH, who will be furloughed. Prior to becoming connected with the Whiting Corp. in 1927, Mr. Bean spent 26 years in the malleable foundry field. Following graduation from Virginia Polytechnic Institute he was a special apprentice with the Atlantic Coast Line railway. Later he became connected with the Symington Co., Rochester, N. Y. During the 12 years he was connected with that firm he rose from the position of inspector to works manager in charge of foundries at Corning, N. Y. and Rochester, N. Y. He then became

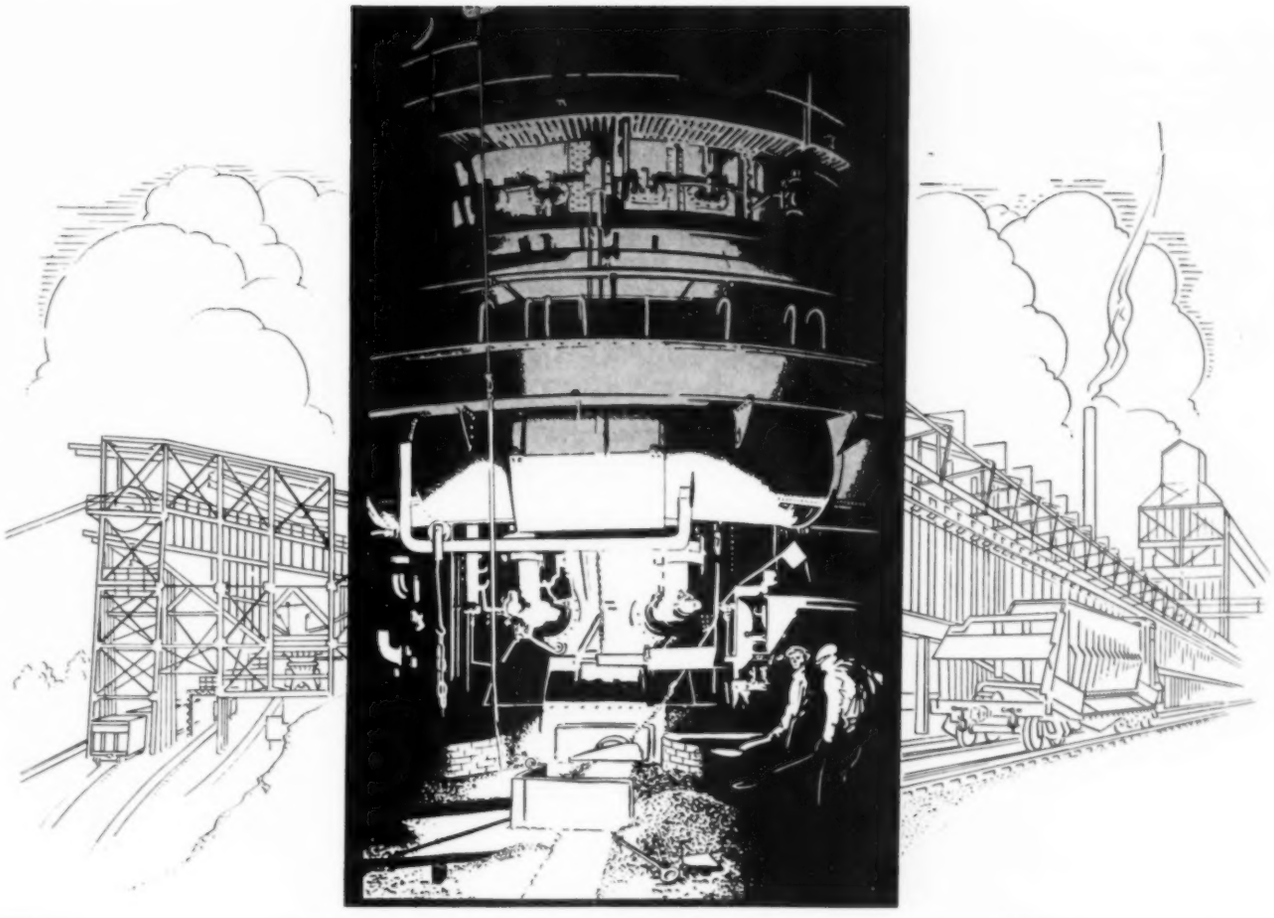
(*Concluded on page* 80)

W. R. Bean

T. I. Phillips

N. H. Boardman

A. T. Chandonnet



Here's Where Defense Begins

● Tanks . . ships . . guns . . shells and a very large proportion of other defense goods are born in the fire of a blast furnace from the union of iron ore with coke and limestone.

Wherever uniformity and dependability are vital in speeding defense products to completion—dependence can be placed on—

WOODWARD IRON

—manufactured by America's largest completely integrated and entirely independent merchant iron producer, which mines its ore, coal and limestone on its own properties and moulds its own policies as well as pig iron.

WOODWARD IRON COMPANY

WOODWARD, ALA.

Independent Since 1883

★ ☆ ★

(*Concluded from page 78*)

connected with the Eastern Malleable Iron Co. and remained with that organization until joining the Whiting Corp. Mr. Bean is a past president and an honorary member of the American Foundrymen's Association.

♦ ♦ ♦

JOHN H. O'SULLIVAN has been appointed district sales manager, Peninsular Grinding Wheel Co., Detroit. Mr. O'Sullivan formerly was with the Crucible Steel Co. of America.

♦ ♦ ♦

L. C. MCANLY, for several years in charge of manufacture, Rockwood Mfg. Co., Indianapolis, has been appointed works manager, Fruehauf Trailer Co., Detroit. Following graduation from Purdue University in 1917, he joined the Rockwood company, starting in the purchasing department. He was factory superintendent from 1920 until 1934 at which time he joined Maytag Co., Newton, Iowa, as assistant factory manager. He returned to Rockwood in 1936 as factory manager.

♦ ♦ ♦

C. E. HERINGTON, formerly advertising manager has been appointed sales director of a newly created sales service department established by the Meehanite Research Institute of America Inc., Pittsburgh. He will continue to supervise the organization's promotional activities.

♦ ♦ ♦

JAY T. OSLER has been elected chairman of the board, Continental Roll & Steel Foundry Co., East Chicago, Ind., to succeed the late Albert Pack. Mr. Osler will continue in his capacity as president. JOHN W. HUBBARD, chairman, Hubbard & Co., Pittsburgh, was elected a director to succeed Mr. Pack, and the board was increased from six to nine members. G. N. HERMAN, vice president in charge of sales, and M. G. STERNBERG, vice president in charge of operations, Continental Roll & Steel Foundry Co., and G. D. PATTERSON, partner in the law firm of Winston, Strawn & Shaw, Chicago, were elected to the newly created posts.

♦ ♦ ♦

THEODORE TRECKER, HERMAN PUPHAL, FRED MICKELSON and WILLIAM TOEPFER, members of the Kearney & Trecker Corp. old-timers' club, Milwaukee, received watches at a dinner Nov. 15 in reward for their long service with the company. Mr. Trecker, founder and president of the firm, was presented his watch by his son, Edgar, works manager.

♦ ♦ ♦

H. T. FLORENCE has been appointed vice president, Cleveland Crane & Engineering Co., Wickliffe, O. That position is in addition to his present capacity of general manager. Mr. Florence has served with the company for 20 years in various shop departments, engineering and sales. W. C. SAYLE, who formerly was vice president has been elected president. He succeeds his father, the late W. D. Sayle who founded the company in 1897.

♦ ♦ ♦

W. S. DAVIS JR., assistant sales manager of Penola, Inc., Pittsburgh, since 1934, has been appointed manager, succeeding D. V. STONAKER, who retired on Nov. 1. Mr. Davis also has been elected a director and vice president. All of Mr. Davis' experience since his graduation in 1924 from Lehigh University with a degree in mining engineering has been in the petroleum business. He began his career as a laboratory assistant in the development department of the Standard Oil Co. of New Jersey at Elizabeth, N. J., and three years later became a lubrication salesman at Trenton, N. J. In 1929 he joined the Standard Oil Co. of Pennsylvania and advanced in various sales capacities to management of lubrication sales, which position he held for four years prior to his joining Penola as assistant sales manager.

♦ ♦ ♦

THOMAS BRIER recently has become assistant superintendent, Windsor Foundry Corp., Windsor, Vt. Mr. Brier served a 7-year apprenticeship with the Davy Bros. Engineers, Sheffield, England and came to the United States in February, 1926. He has been connected with the Jones & Laughlin Corp., Pittsburgh, Landers, Frary & Clark, New Britain, Conn., Sessions Iron Foundry, Bristol, Conn., and for the past 2½ years has served with the Hendey Machine Co., Torrington, Conn.

♦ ♦ ♦

C. E. ADAMS, chairman, Air Reduction Co. and United States Industrial Alcohol Co., New York, has assumed charge of the Iron and Steel branch, OPM. He succeeds ARTHUR D. WHITESIDE, president, Dun & Bradstreet, who resigned Dec. 1. Mr. Adams first joined the defense program in June, 1940 as senior administrative assistant to E. R. STETTINIUS JR. on the National Defense Advisory commission.

Foundry Equipment Order Extended

General preference rating order No. P-31 which assigns limited blanket ratings of A-1-b and A-1-c to a limited number of producers for the production of certain materials essential in manufacture of 12 types of foundry equipment, was extended recently to May 30, 1942. General preference rating order M-17 for pig iron also was extended to expire on Dec. 31, 1942 as were orders M-21, M-21-a and M-21-b for steel.

J. T. Osler

C. E. Adams

W. S. Davis Jr.

H. T. Florence

HOW TO win medals FOR better NON-FERROUS castings

TURNING out sound non-ferrous castings is easier than at first appears, when Truline* Binder is used in the cores. For Truline Binder is just the thing for those tough jobs in brass, bronze, aluminum, or magnesium alloys. The cores collapse so fast that there's little danger of core resistance causing shrinkage cracks.

Convenient-size Bag Is Easy to Handle

And for magnesium there's a special advantage. You can bake Truline-bound cores as low as 300° F., and get adequate strength. This means inhibitors can go right in the mix—no need for the extra operation of spraying them on the surface of the dried core.

In all casting work, ferrous or non-ferrous (except for very heavy sections), you'll find Truline Binder is one good way to get more sound castings, faster at less cost. You'll find that sand is easily and quickly removed, saving a large part of the normal cleaning time. You'll find that shorter bakes are giving you more cores per oven per hour.

So, if you want to win medals for good castings, clip the coupon and send it along. We'll see that you get the facts about Truline, and a sample if you want it.

HOW TRULINE BINDER INCREASES PRODUCTION IN MANY FOUNDRIES

SAVES TIME ON BAKING Truline Binder bakes through quickly—increasing core oven output. Time saving is sometimes as much as 30%.

SAVES TIME ON CLEANING Cores collapse quickly; this makes cleaning faster. Some foundries have cut cleaning time 50% with Truline Binder.

SAVES TIME ON RAMMING Flowability of Truline Binder mix speeds ramming, particularly in green sand facings.

*Reg. U. S. Pat. Off. by Hercules Powder Co.

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☐ Aluminum ☐ Magnesium ☐ Brass ☐ Bronze

Name .....
Company .....
Street .....
City ..... State .....

JJ-45

THE ADVENTURES OF BILL

BY PAT DWYER

Drawings By RICHEY

THIS weather," I said to Bill the other night, "takes all the gimp out of a fellow and brings on a kind of mild melancholia. He reviews his life and all he can think of is the cruel bumps he received at one time or another. Friends and relations come to mind, those who died in the long ago and those who passed away since last November. He contrasts his experience with that of some lucky dogs who apparently never suffered a moment's grief—"

"Snap out of it," said Bill. "If I did not know you better I should say you are suffering from a hang over induced by an over dose of the stuff that bites like an adder and stings like a serpent and all that kind of stuff. What you need is a good jolt of senna tea. I have not seen or smelled this horrible brew since I graduated from short pants, but I drank enough in my younger days to float a fair sized battle ship. My saintly old grandmother, God rest her, had the most implicit faith in this sovereign remedy. It did not matter whether we showed symptoms of coughs, colds, hoarseness, stomach ache, blind staggers, botts or spavin the old tea pot was put on the fire. Then while mother or father held us in a vise like grip, she held our nose with one hand and spilled the nauseating brew down our throats with the other hand. I don't know if it was a mental or physical reaction, but the stuff never failed to effect a cure. I gag now when I think of it, but I could watch you drinking it with the greatest pleasure. What do you say if I run down to one of the stores and get a supply? I can brew you a pot full in a minute."

"How would you like," I inquired politely, "to go down to the Ninth street pier and take a jump in the lake? You and your grandmother and your pot of senna tea. I had a similar experience to your's in my young days. I remember on one occasion I fled from the house without any breakfast and remained hidden all day. When the pangs of hunger finally drove me indoors at night I was pounced upon and filled to the Plimsol mark with a triple strength dose brewing in the pot all day. Don't mention the stuff to me. I have troubles enough already."

"Trouble?" Bill said. "Boy, you don't know what trouble is. Wait until next spring when your dear old Uncle Samuel, your generous old Uncle gives you the option of handing over most of your income or going to jail for the rest of your natural life. That is not the feature," he continued, "that burns me

One might think he didn't like it

up. Here, listen to this editorial I clipped out of the paper the other day:

If you are a married man and have an income of $1600, your federal income tax next March 15 will be about $5. That's enough to buy one steel helmet for one enlisted marine. If you could be sure your $5 would be used for that purpose, you might get some satisfaction in knowing you were contributing something to defense. But your government spends money for items that have nothing to do with defense. For instance, quoting at random from the Procurement Division's General Schedule of Supplies: Smoking stands, Specification No. 348; light bronze, dark bronze, ebony and mahogany; Full rocking, type 1, estimated shipping weight, 17 pounds; (a) delivered to departments, Washington, D. C.; price $6.90 each. Your $5 would not pay for a smoking stand; Full rocking, type 1. Further down the list is another smoking stand, weighing 8 pounds classified as Semi-rocking, type 11, which the government purchases for $4.05. So, after all maybe your tax payment will be enough to buy a gadget for a bureaucrat's office, with a little left over. If you have to do without a pair of shoes to pay that tax you might wish that said bureaucrat would try to get along on last year's ash tray.

"How will you like that, hey? I am willing to bear my share of all legitimate government expense, but with millions of other patriotic citizens who love their families, their land and its institutions, I cannot stomach the manner in which the government, bureaucrats, harpies, parasites and hangers on fling away the money uselessly. We boast that we are a democracy in which the government is elected to carry out the wishes of the people. The government is big business. How long would a private business, or how long *could* a private business tolerate such conditions?"

"I am no good at conundrums," I said. "Ask me something easy. Perhaps a good dose of senna tea distributed with a generous and lavish hand in the morning and again during the siesta hour in the afternoon in Washington might have a salutary effect."

"No good," Bill exclaimed disgustedly. "Them birds in Washington are too wild already. Give 'em a dose of senna tea and nobody could catch 'em. They remind me of the old time conundrum 'Why is or are a sailor's pants like two French towns?' and the answer me brave boy in case you have forgotten this important piece of literary lore is 'Because they are too long and too loose'."

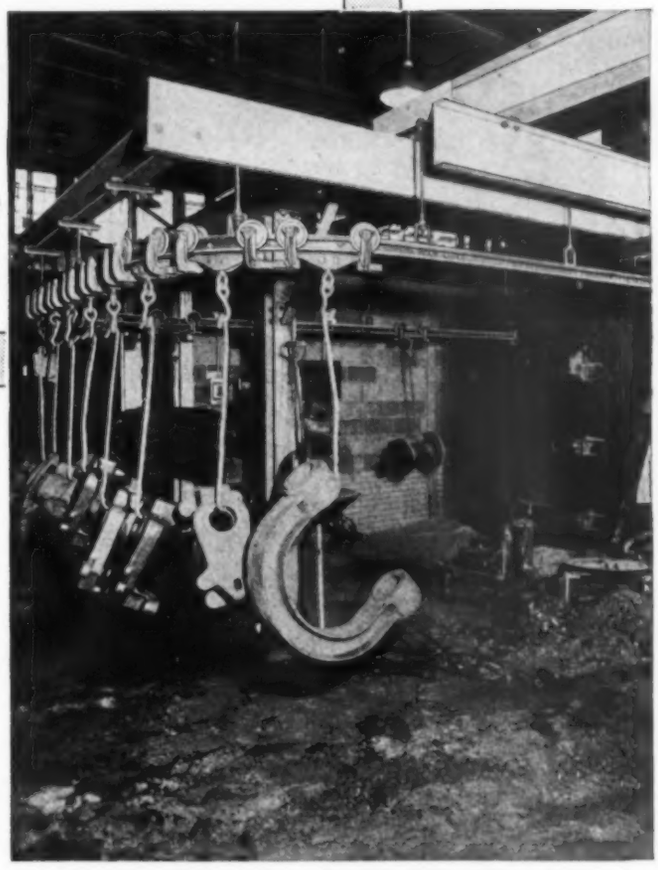
(*Continued on page* 84)

Now PRODUCTION Doubled-Trebled

NEVER before in the history of this great country of ours has the demand on industry been so great. It is production—faster, faster, faster! And faster production means systematic production. All work must move along easily, quickly, and efficiently.

American MonoRail Equipment increases and helps speed up production. It also reduces handling costs. It relieves men from lifting and carrying, and enables them to give full time to production. American MonoRail Equipment keeps materials and products on scheduled routes without congestion, delay, and damage in transit.

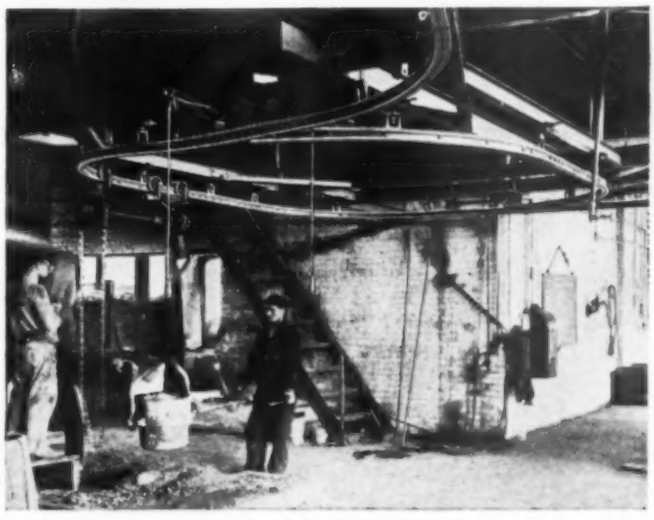
Standard parts are assembled into complete systems to meet the special requirements of the particular job. Supplied for manual, electric, or automatic operation. No job too small, none too large. No interruption to your production during installation. Let an American MonoRail Engineer show you how to "open the production throttle" in your plant.



Easy rolling trolleys speed up movement of heavy castings through sand blast room.

●

Flexible MonoRail arrangement insures safe handling at cupola.



THE AMERICAN MONORAIL CO.

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WRITE FOR Blue Book illustrating hundreds of MonoRail installations.

IF YOU *Plan* TO BUILD OR EXPAND ★ ★ ★

The complete facilities of our engineering staff are at the disposal of any company—their architects or engineers—planning to expand or construct new buildings. Through long experience, we are able to cooperate effectively in planning right heights, proper sizes and placement of structurol members, and in other ways which result in buildings being designed to fit the needs of the user. This service is yours for the asking.

(*Continued from page* 82)

"I don't get it."

"You would be a fine lad on the Information Please program. No silver dollars for you. For your information Toulon, full name Toulon-Sur-mer, is a fortified town on the Mediterranean about 42 miles from Marseilles. Toulouse is on the Garonne about 162 miles southeast of Bordeaux where so many American boys landed in 1917 and 1918."

"Sounds silly to me. How do you stretch Toulon into too long?"

"How the—well, how do I know? That is the way I heard it and it always sounded kind of cute. Must be an English joke. Over in the tight little island the letter g is treated with little or no respect. They stick one on, or take one off just as readily as they juggle the letter h. Toulon by itself would not serve, so they stuck a g at the end and the result is a quite capital wheeze."

"Out of Punch, no doubt."

"Possibly. I heard it first about 50 years ago. One of my grandsons brought it home the other day. He really thought he had something new.

"I had a letter from a foundryman some time ago. He is located in a sparsely settled district away out back of beyond and has to rely on himself. He had a big brass or bronze pump body to make, too big for the capacity of his pit type crucible furnaces. He wanted to know if it is feasible to melt the metal in his cupola. In the shop where I served my time an occasional heat of bronze was melted in the cupola. At that time old foundrymen told me of doing the same thing years before I was born. This man never had any experience in that line and he felt pretty much as a young lad maneuvering for his first kiss. Here, I'll read you the letter:

Lacking pit crucible capacity I have to melt bronze in a 27-inch cupola for a pump body casting weighing 1500 pounds with gates and risers. Metal supply includes scrap bronze, copper wire, ingot tin and zinc. In our present cupola practice for melting iron and steel scrap, the bed varies from 38 to 48 inches depending on the amount of steel in the charge. The blast pressure is 7 ounces and the charge is allowed to soak before starting the fan. In what particular or particulars does cupola bronze melting practice differ from the foregoing? We shall appreciate your opinion on the proper height of bed, weight of charge, coke and metal, flux and deoxidizer. Presumably the tin, zinc or 50-50 nickel alloy is added at the spout, but I am wondering if the metal coming from the cupola will be hot enough to absorb the spout additions.

"A good sensible letter. I trust you did not disappoint him."

"Well," said Bill, "I'll tell you. To treat the subject properly, I really should write a book, but since I am no book man I boiled the essentials down to the following:"

Melting bronze in the cupola presents no unusual hazard if the melter bears in mind that bronze melts at a much lower tetmperature than iron. For this reason the cupola is operated at about one-third of the usual speed and capacity. Thus where the normal consumption of air is 1200 cubic feet per minute in a 27-inch diameter cupola melting gray iron, approximately 400 cubic feet per minute will be sufficient when melting bronze. The pressure is reduced from 6 ounces to 2. In addition to melting at a lower temperature, the bronze metal has an amazing affinity for any unconsumed oxygen in the blast. The gentle blast and reduced volume constitute a fairly safe guarantee that all the oxygen will unite with the carbon in the coke.

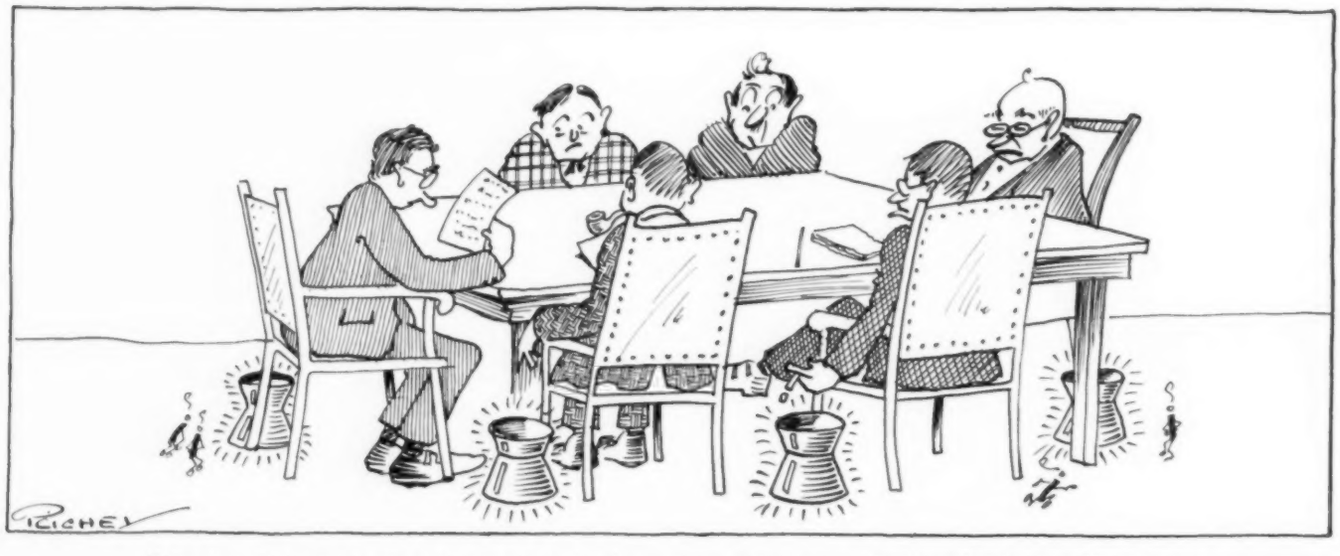
As a possible item of interest, a special cupola was developed several years ago for melting bronze. It was described and illustrated in the Dec. 1, 1929 issue of THE FOUNDRY. Main feature of the cupola was an expansion chamber outside each tuyere. Here the blast had a chance to expand and thus enter the cupola in a mild condition. The outer ends of the expansion chamber were provided with shutters by which the volume of blast might be regulated. The same general design was shown in the description of a small cupola designed by the late Thomas Johnson in Melbourne, Australia and presented in the Oct., 1939 issue of THE FOUNDRY.

Up to the present we have not seen, heard or read of any person trying the experiment, but we see no reason why bronze cannot be melted in the cupola without the use of any artificial blast. With the tuyeres wide open and a fairly high stack the temperature should equal that obtained in the usual type pit furnace. The only difference in condition is that in one case the metal comes into direct contact with the fuel, while in the other, metal and fuel are separated by the comparatively thin wall of a crucible.

You probably are familiar with the fact that in bell foundries and other places where large quantities of bronze are required for heavy castings, the metal is melted in a reverberatory or air furnace that differs in no essential respect from the furnaces employed in all metal working centers, for hundreds of years before the cupola was invented. The foregoing data are for your general information and for adoption in some form or other in the future when you have the time and the opportunity.

In your present emergency we suggest the following procedure: Light the bed in the cupola and build it up to about 30 inches above the tuyeres. When it is burning brightly, dump in the charge in three 500-pound lots with 50 pounds of coke between first and second, and between second and third. Close the

(*Concluded on page* 144)



Believing that no sacrifice is too great in the present emergency, the board tolerates $5 spittoons

The Symbol of LEADERSHIP IN CORE OVEN ENGINEERING

The character of equipment offered by a maker is reflected by the Customers served; particularly where "repeat" orders follow earlier ones.

Below are listed typical Companies who have bought various types of YB Foundry Ovens during recent months.

Reading Steel Castings Div.	Walworth Company
Mackintosh-Hemphill Co.	Bohn Aluminum & Brass Corp.
Budd Wheel Company	Doehler Die Castings Co.
Bendix Aviation Corporation	Globe Valve Corporation
New York Air Brake Co.	Burlington Brass Works
General Electric Co.	Ray Day Piston Company
Pacific Steel Castings Co.	Commerce Pattern & Fdry. Co.
Hillis & Sons, Ltd.	Continental Roll & Stl. Fdy. Co.

U. S. Navy (for Ships and Naval, Air, and Submarine Stations) here and overseas.

To make the list complete, and to add those purchasing YB ovens for *non-foundry* purposes, would be an interesting "Directory" of the exacting buyers of Industry.

The types represented include drawer pull, shelf, cabinet, lift rack, car, and conveyor; the heating,—gas, electricity, oil, coal, and coke. All have recirculation.

Greater heating economy is reported; from 30% to 50% saving in baking time; uniformity of cores or molds; and greatly decreased rejects.

Such advantages pay for the cost of new ovens, and make the non-modern oven a *financial liability.*

YB Engineer to discuss your Core Baking needs.

YOUNG BROTHERS CO.

INDUSTRIAL OVENS FOR ALL PURPOSES

6508 MACK AVENUE • DETROIT, MICHIGAN

Branch Offices in principal Industrial Centers

In California at:

277 SEVENTH ST., SAN FRANCISCO and 406 SO. MAIN ST., LOS ANGELES

ANNUAL *Open House* COMMEMORATES 50th ANNIVERSARY

THE annual plant visitation staged recently by the Hamilton Foundry & Machine Co., Hamilton, O., also celebrated the fiftieth anniversary of the founding of that company. On Sunday, Nov. 9, 1941, from 11 a.m. to 4 p.m. officially, but actually from 10:30 a.m. to 7:30 p.m., the management of the company was host at an open house to the employes and their families.

The accompanying illustrations show some of the 1078 persons who attended the hour and one-half movie program, inspected the plant, ate 2000 doughnuts, drank 50 gallons of cider and 20 gallons of coffee, ate 1500 lollipops and 1000 ice cream sticks. Each visitor was given a cast iron paper weight souvenir made for the occasion.

In preparation for the event, a special invitation was extended to all employes and their families. Upon arrival at the plant on Sunday morning, the visitors first registered and then were shown various displays including fingerprinting on civil fingerprint cards, safety and hygiene displays and the various features of the plant. Employes who desired were allowed to receipt for and take possession of individual badge and cards on that day.

The new assembly room, located above the offices and storeroom, was open for the first time to the public. The room was decorated in a patriotic motif with flags and bunting purchased through donations of the employes as a surprise to the company president, Peter E. Rentschler.

The motion pictures included official United States Navy film show-

(*Concluded on page* 89)

Views taken of the large group attending and some of the displays

Automotive exhaust manifolds must have resistance to growth, and good strength at elevated temperatures. Competitive conditions demand minimum costs.

An iron containing about 3.30% C — 2.20% Si — 0.70% Mn — 0.60% Cr — and 0.60% Mo does the trick, while holding down foundry and machining costs.

This Chromium-Molybdenum combination is characterized by high strength and toughness at the working temperatures encountered in exhaust manifolds. Its growth resistance prevents warpage and cracking — saves gaskets.

Send for our free technical book, "Molybdenum in Cast Iron," giving detailed data on Molybdenum irons of interest to production engineers and executives.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTES FOR THE CUPOLA · FERROMOLYBDENUM FOR THE LADLE

Climax Mo-lyb-den-um Company
500 Fifth Avenue · New York City

MOLY

RHYTHMIC TURNINGS

Put an ear to the iron casting being turned on one of today's modern machine tools with its positive feeds . . . If the casting possesses a deep, unwanted chill —the turnings perform some fancy arcs, while the cutting tool quickly loses its efficiency to a chattering tune.

Present day machine shop production demands that grey iron and malleable castings be cast with a controlled chill for easier machinability . . . and No. 8 Mexican Graphite makes this absolutely possible!

Our Bulletins describe the simplicity with which No. 8 Mexican Graphite may be used—plus a host of useful information on chill control. Write for your copies!

THE UNITED STATES GRAPHITE CO.
SAGINAW MICH.

NO. 8 MEXICAN GRAPHITE

IN LINE FOR NATIONAL DEFENSE
GRAY IRON and MEEHANITE CASTINGS
THE HAMILTON FOUNDRY & MACHINE CO.
QUALITY CASTINGS
MEEHANITE METAL
METAL
LINKING TWO FAMOUS SEALS IN NATIONAL DEFENSE

Annual open-house held at Hamilton Foundry & Machine Co. attracted a large crowd

(*Concluded from page* 86)
ing the Pacific fleet in action in deep water and some of the tactics of the fleet air arm. Natural color motion pictures of the "Parade of Progress", one of the features of the recent Hamilton-Butler country sesquicentennial celebration, which were taken by Mr. Rentschler, and pictures of the vocational education course that is sponsored by the foundry also were shown.

The first Hamilton Foundry & Machine Co. open house for employes and families was held in 1938. Each year the interest in this continues at a high point.

Large Trade School Proves Its Worth

Washburne Trade School, Chicago, one of the first to be devoted to vocational training is covered exhaustively by John A. Lapp, in an attractive volume 6 x 9 inches, 249 pages recently published by Fred Klein Co., Chicago. The foreword claims this book is the result of life long interest and studies in vocational training on the part of a layman in the field. The author was a member of the commission on vocational education appointed by President Wilson in 1914 which framed the Smith-Hughes act. Twenty four years after the passing of the act he returned to the field to see concretely what it had accomplished.

The Washburne Trade school, an outstanding example of a Smith-Hughes act, was chosen for the study. The scope of the work is indicated by the following chapter headings: 1—The field of Washburne's work; 2—Outline history of Washburne; 3—Training of apprentices; 4—Unit trade training; 5—Continuation education, commercial; 7—Co-ordination of school with industry and commerce; 8—Planning the curriculum; 9—Trade teachers and their qualifications; 10—The evening trade school; 11—Vocational guidance and placement; 12—Buildings and equipment; 13—Opinions of Washburne; 14—Future of Washburne.

The Washburne Trade School is the central and most important vocational school of the public system of Chicago. It is distinctly vocational in that its purpose is to prepare students for actual work, or to increase their skill and knowledge in some gainful pursuit, industrial or commercial. It is not a school for general training of young people, but a place where individual skill is developed or enlarged in some calling and knowledge related to such skill or calling is imparted. At any period and especially under present conditions, the book should serve as a guide and inspiration to all who are engaged as present or prospective students, teachers or in any manner interested in the subject of vocational training.

Johns-Manville Corp., New York, is constructing an asbestos mill for processing large quantities of asbestos bearing rock on the company's properties in Chrysotile, Ariz.

To Meet in Detroit

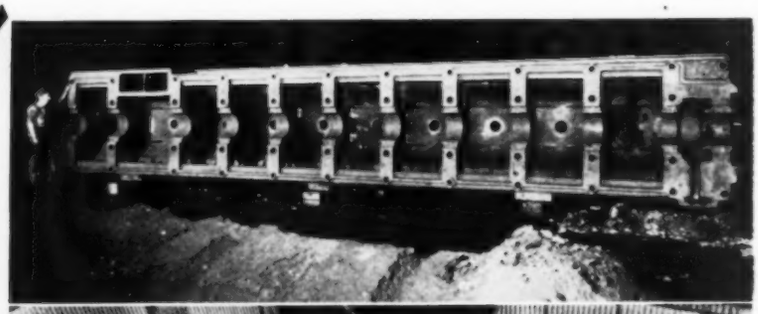
Twenty-fourth National Metal Congress and Exposition will be held in Detroit, during the week of Oct. 12, 1942, according to a recent announcement by W. H. Eisenman, secretary of the American Society for Metals. The show will be held in Detroit's convention hall. The American Society for Metals, American Welding Society, Wire Association, the Institute of Metals division, Iron and Steel division of the American Institute of Mining and Metallurgical Engineers will hold their annual conventions in conjunction with the metal show.

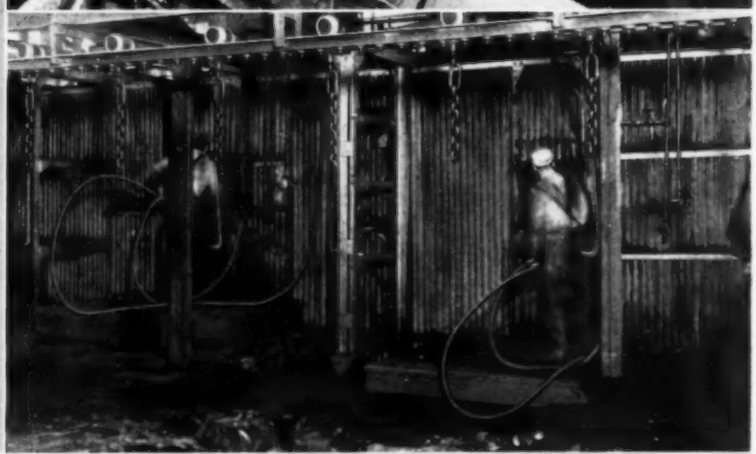
Will Construct New Research Building

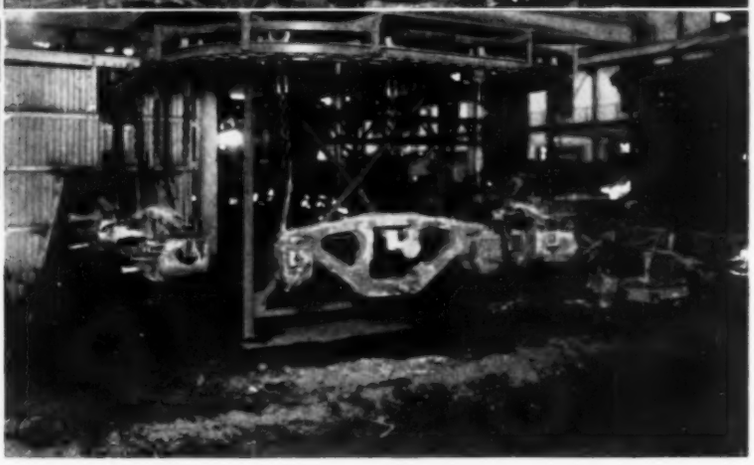
Armour Research Foundation, Illinois Institute of Technology, Chicago, is building a metallurgical research building. The building fully equipped will cost $250,000. Two cupolas, one having a capacity of 3000 pounds per hour for melting iron and the other having a capacity of 1000 pounds per hour, will be installed. The 3000 pounds per hour unit now is in use in the old laboratory. In addition a bessemer type converter, two electric furnaces having a 500-pound and a 10-pound per hour capacity, and other equipment for chemical analysis, physical testing, machining and metallography will be installed in this latest addition to the establishment.

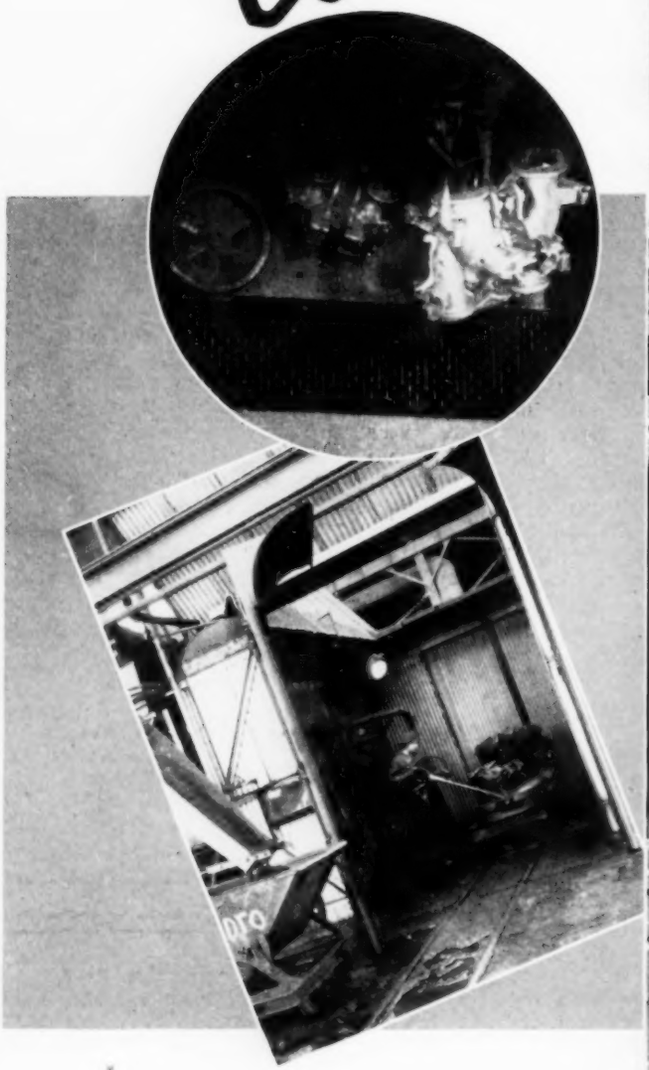
TODAY! HYDRO-BLAST

When Time and Money Count









Hydro-Blast flexibility of design makes it possible to install this modern method in any foundry regardless of limitations of shop layout and other factors.

Cleans Castings Faster and Better

FROM 2 OUNCES TO 200,000 POUNDS

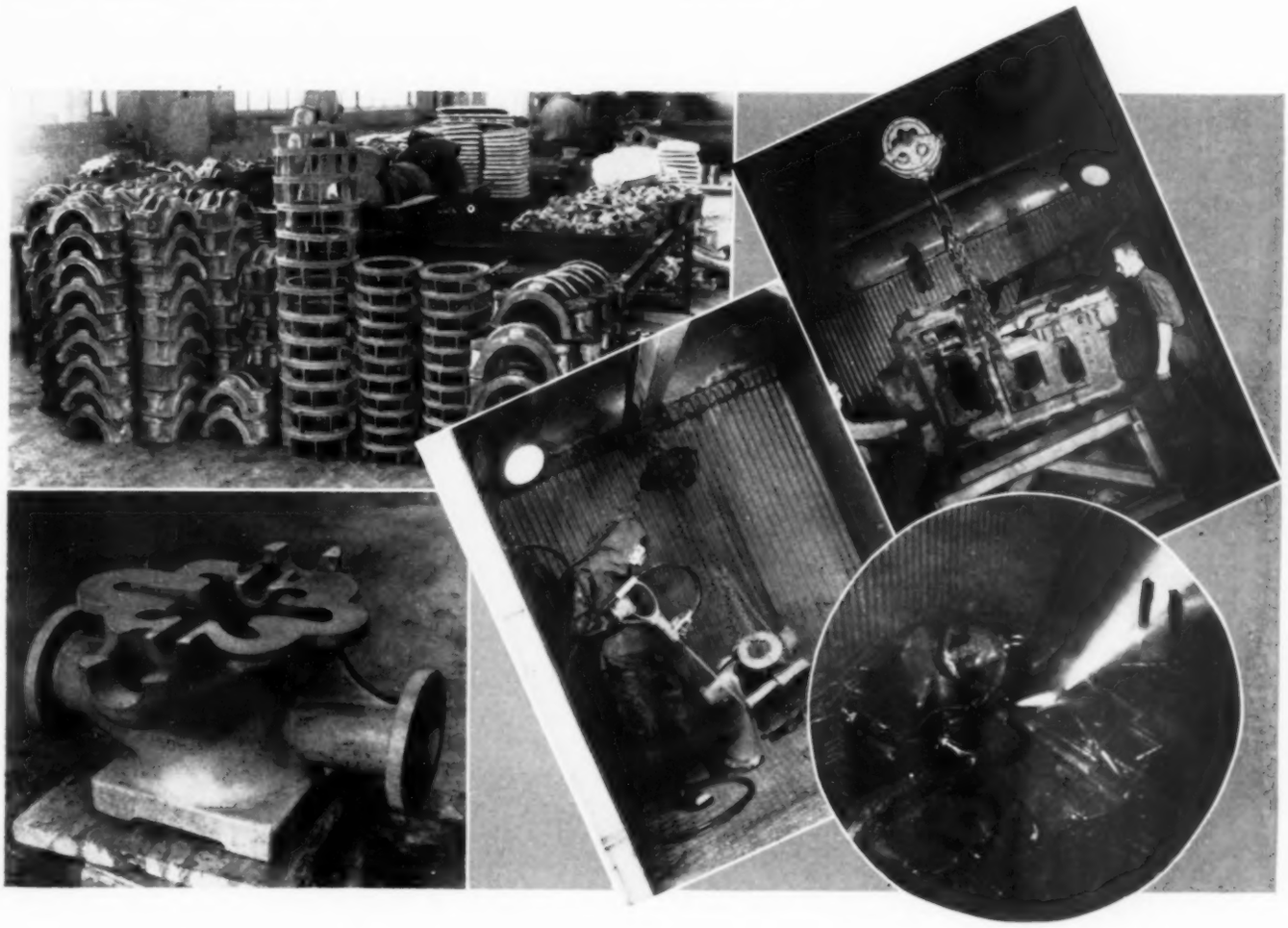
Magnesium . . . Brass . . . Aluminum . . . Gray Iron . . . Steel

Today! Hydro-Blast is decoring and cleaning the widest variety of castings without creating dust; in all kinds of foundries; large and small, jobbing and production.

Hydro-Blast installations may be designed for cleaning castings only; for cleaning the casting, washing and recovering the core sand in a dewatered condition; for performing all those functions, plus drying the sand to a predetermined moisture content.

These essential operations are performed in a fraction of the previously required time. In many instances economies are so substantial as to return the investment in Hydro-Blast during the first twelve months of operation.

Hydro-Blast is proving every day—now, when time and money count—that it is the foundry's most economical method for cleaning castings of all kinds and sizes—in jobbing and production shops.



The **HYDRO-BLAST** *Corporation*

Dustless Core Removal · Surface Cleaning · Sand Recovery

3118 CLYBOURN AVENUE • CHICAGO, ILLINOIS

ORGANIZING TO PROTECT INDUSTRIAL PLANTS

WAR, such as is being waged by our enemies, emphasizes the immediate need of detailed plans for the protection of industrial plants from air raids, fire, sabotage, etc. In preparation for such emergencies, the United States Office of Civilian Defense recently published a number of pamphlets, including one entitled "Protection of Industrial Plants and Public Buildings." Until detailed plans can be prepared for specific industries, the following discussion, taken from that presentation, should be of considerable value. Extent of the detailed organization of course depends upon the size of the plant, but provision should be made for each and all aspects of protection.

It is essential that protective organization be developed at once to guard against the disruption of normal activities and for the safety of the personnel in an emergency. The general plan is to provide for the security of every employe and for the maintenance of production at the highest possible rate.

Protective measures should recognize that the effect of a bomb is local. Damage is therefore less when operations are decentralized, dispersed, and duplicated among many small plants or buildings. So far as is economically possible such arrangements should be made. Similarly, each plant should be prepared to protect itself, independently of any possible outside assistance.

Ready for installation in 28-ton Chrysler M-3 tanks, these 4000-pound turret castings have just been received at the huge Chrysler tank arsenal in Detroit. More than 10,000 men are engaged at this plant in production of the medium "rolling arsenals." OEM photo

It is recognized, however, that arrangements for exchange of information and mutual assistance should be made between plant managers and local governmental authorities, including the local defense council or agency. Local authorities should rely upon plant services for aid if necessary.

The protective organization in each industrial plant, business, establishment, or public building should consist of a plant defense co-ordinator and four heads of divisions. The divisions are fire, police, medical, and maintenance service.

In the office of the plant defense co-ordinator, provision should be made for communication with the civil air raid warning system, control of transportation facilities, and liaison with local governmental authorities.

Develop Communication System

The plant defense co-ordinator is responsible for developing a communication system within the plant to permit the immediate transmission of messages between the co-ordinator and squads organized under the various divisions, and between squads. The report center under the plant defense co-ordinator should have a system of reports from each squad and from each key position so that the co-ordinator will know when his plant is "manned and ready." Check-off lists should be developed and be on hand. A distinctive signal, such as a gong, rapidly beaten triangle, or other percussion sound, should be arranged to indicate a gas attack.

Since telephones may become overloaded or out of order, arrangements must be made for emergency methods of communication, such as runners and cyclists.

All transportation equipment should be allotted by and under the control of the headquarters of the plant defense co-ordinator.

The plant defense co-ordinator should be a clear-thinking individual capable of taking charge of action in an emergency. He should be able to get things done without friction or loss of time. This plant defense co-ordinator has full responsibility for preparing plans, organizing and equipping squads, and training personnel. During an emergency he has control of the dispatch of all squads.

(Continued on page 94)

Bentonite Birthplace

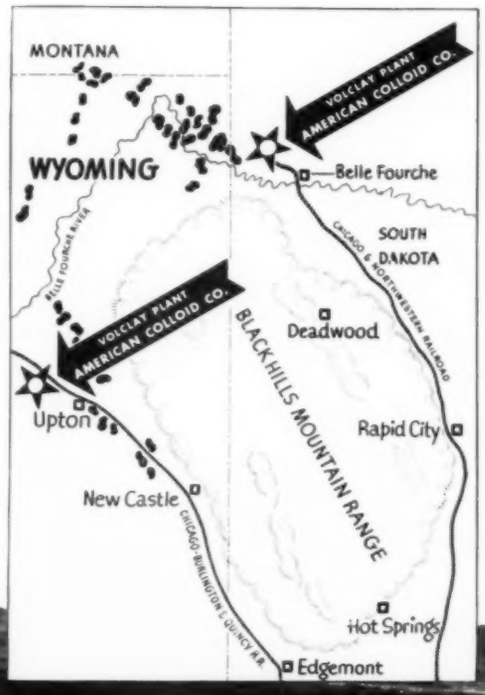
Have you ever stopped to think how bentonite is "born" or "discovered" for use in your industry?

Let us tell you how our company has done it. In 1924, long before any rush for bentonite lands was even contemplated, we began acquiring top-grade acreage. We realized then that the selection of deposits was a science.

Bentonite is found in stratas from 1½ to 2½ feet thick, not covering large areas solidly, but scattered irregularly over the map and often intermixed with other materials. This meant that meticulous care had to be taken in the selection of the deposits. Drilling crews, directed by the Head of the Geological Department of a large Western University, have combed the region for us gathering thousands of samples for laboratory evaluation.

By arriving in the bentonite fields first, and taking the cream of the crop by careful selection and elimination, we were able to accumulate the largest and finest holdings in the world.

It is this vast, scientifically selected acreage that forms the background for our two processing plants and it insures our customers a constant flow of the highest quality Black Hills bentonite for many years to come.



The deposits are found North and West of the Black Hills Mountain Range. Each black dot represents a group of bentonite beds.

VOLCLAY BENTONITE

AMERICAN COLLOID COMPANY • CHICAGO

(*Continued from page* 92)

Heads of divisions should be well qualified in their respective fields of work. They should also be capable of managing men and of taking charge of unusual incidents.

Within each division, squads should be organized to render the particular service for which the division is responsible. Usually a squad will consist of 4 or 5 individuals or as many as the plant defense co-ordinator believes is necessary. So far as possible, individual employes should be assigned to the type of protective work for which they are best suited. Training of personnel should provide first for the training of individuals, then of squads.

Head Fire Fighting Force

The plant fire chief should be the head of the fire-fighting forces. He will be responsible for the fire-fighting brigade and for the equipment, both heavy and portable, permanent and temporary. An inspection and survey should be made immediately and all precautions taken, such as the removal of old equipment and rubbish from roof spaces. Access of the roof should be provided. The adequacy and availability of water supply, both main and auxiliary, should be studied. All men assigned to the fire brigade should be taught the latest methods of fighting fires and dealing with incendiary bombs.

Fire-watcher squads should be organized, equipped, and trained. Their duties will be to watch for, locate, and handle incendiary bombs so as to prevent a small flame from becoming a conflagration. Normally, fire-watcher squads will handle incendiaries but they should be prepared to call for assistance.

Rescue squads of specialists, such as engineers, carpenters, bricklayers, welders, shorers, and electricians, should be organized, equipped, and trained to rescue people from damaged buildings. Their duties may be extended to include emergency handling of utility services. They must be able to work in silence, with hand signals. They must be trained in first aid. They must be capable of acting directly and quickly.

Organize Fire Department

A competent fire organization consists of:

1. A main observation post, with such additional observation posts as may be necessary for observation of the entire area.
2. Protected fire-watcher posts, with necessary men, equipment, and independent water supply. These posts should occupy an elevated position to cover local buildings with high fire risks, or buildings vital to production.
3. Fire posts conveniently situated, but dispersed and decentralized, with necessary equipment.
4. Adequate main and auxiliary water supply systems.
5. Fire squads organized and ready to deal with incendiary and high explosive bombs and fires.
6. A direct communication system between fire-watcher posts, fire squads, and the headquarters of the plant fire chief so that reports of fire may be made and assistance may be sent when necessary.

The plant police chief should be in charge of the following: All police activities; the work of air raid wardens and aircraft observers; and training in gas defense and the wearing of protective devices. He should have general responsibility for maintenance of discipline and for development of morale.

The police chief should supervise all guards and watchmen, should be responsible for all persons entering the plant area, and should be charged with safeguarding of the plant and its material from subversive activities as well as from theft. He should control all traffic and maintain a clear route to permit the necessary automobiles, rescue trucks, etc., to reach the scene of an incident. The handling of all unexploded missiles, whether high-explosive or incendiary bombs, should be one of his responsibilities, and his men should be given special training for this work.

Under the plant police chief, there should be a senior air raid warden in charge of all wardens and observers or spotters. Persons serving as wardens must be calm individuals with presence of mind who can act as advisers and guides to other employes. The wardens will be trained to work in conjunction with the local air raid warning system. They will observe where bombs fall and fires break out.

Report To Warden

The observers should be placed on the top of a substantially constructed building in order to command as extensive a view as possible of the surrounding buildings and areas. They will report the approach of planes, bombs dropping, fires or anything unusual of which the senior warden should be informed.

The wardens will be prepared to handle the evacuation of employes from the plants to air-raid shelters. Each employe should be shown how to go by the most direct route from his working station to an air-raid shelter. He should go without noise, confusion, haste, or loss of time. Wardens will make certain that all lights are extinguished during a blackout except those permitted to remain lighted for safety or other reasons.

Plant medical service should be under the plant physician or a practicing physician. In addition to his regular training, the plant medical chief should be qualified to handle poison-gas cases. The medical chief will be responsible for the organization of first-aid service and for the training of employes in such measures. So far as possible, all employes should be trained in first aid. Conveniently situated first-aid stations, in charge of trained workers, should be located throughout the plant area. These stations should be amply protected and equipped

(*Concluded on page* 96)

First 60-ton heavy combat tank built in the United States recently was delivered formally to the Army by the Baldwin Locomotive Works, Eddystone, Pa. This tank designated the M-1, has a cast steel turret and cast steel hull

...THIS IS WAR

AMERICA NEEDS YOU!

★ ★ ★

FOUNDRYMEN . . . in this emergency we must

"KEEP 'EM ROLLING!"

"KEEP 'EM FLYING!"

You can help mightily by Modernizing your core and mold ovens—now. Too many existing ovens have been obsolete for 20 to 30 years and are slowing-down much needed production.

If your ovens are of this type why not consult an experienced oven engineering concern at once and

"LET'S GET GOING!"

If you need assistance, our 25 years experience in heat application and forced recirculation for speed, economy and 100% core yield is at your service at no expense or obligation.

McCANN FURNACE COMPANY
5003 EUCLID AVENUE
CLEVELAND, OHIO

Core Ovens—Heat Treating and Annealing Furnaces
Complete Recirculating Heating Systems for Existing Ovens

(*Concluded from page* 94)

to render such treatment as is necessary until the injured person can be removed to a hospital. The ambulance service should be under the control of the medical chief, and only nonwalking cases should be sent to hospitals by ambulance. The plant medical chief should consult with the local health authorities regarding emergency sanitary measures for protection of water and sewage systems, especially the elimination of cross-connection between safe and unsafe water supplies and the elimination of other hazards.

In any war or defense effort, salvage of material is necessary and important. However, salvaged materials must be treated before they can be used again. The medical chief should be responsible for treatment of such materials and for the organization of squads to collect and handle them.

The buildings, equipment, and supplies which tend to keep the munitions of war rolling along must be protected. The maintenance services should be under the engineering chief, who should be a competent all-around engineer, qualified to act in a cool manner in all emergencies. He should have as his assistants the technicians who deal with plant utilities—electricity, steam, gas, water. Skilled workers such as plumbers, pipe-fitters, machinists, welders, etc., should be detailed to key positions ready to do whatever is necessary.

Survey the Plant

The first step should be to survey the plant and make the necessary preparations for the protection of all buildings, with particular attention to the protection of all vital plants, materials, and records. If permanent improvements cannot be made, temporary devices should be improvised. Special attention should be given to the protection of plants, damage to which would seriously impede the war effort. For example, power and boiler houses and special-process plants need all the protection that can be given them.

Air-raid shelters should be prepared for protection from both gas and bombs. Consideration should be given to the safety afforded by these shelters, to entrances and exits, lighting, heating, and ventilation. Provision should be made for the serving of hot tea or coffee and light refreshments.

The control of illumination (blackout) should be studied. Means should be developed to control quickly, to any desired degree, all artificial light so that no light will be visible externally during a blackout.

Tied in with illumination control is the matter of camouflage by day. Any scheme of camouflage should be studied from the air by experts; otherwise, the opposite effect from that desired may be secured.

Key men should be stationed in pairs at the various utility controls, such as telephone switchboards, gas, steam, and water controls and boilers. These men must remain at their post during an air raid to be ready to handle any emergency at that post.

Because the key men must not be removed from their posts, organized repair crews must be ready to handle any emergency in a particular circuit. These emergency repair squads should be men skilled in their regular tasks who can work quickly and efficiently, under adverse conditions.

The latest type of high-explosives bombs has a large blast effect which causes damage to buildings within the blast area. Immediately after an air attack, a survey of the plant must be made so that any dangerous walls or foundations can be shored up or demolished, debris removed, and conditions restored to normal as rapidly as possible. Permanent repairs should be made thereafter. For immediate purposes, it is necessary that damage, shoring, and clearance squads be organized and ready to do their work.

READER'S COMMENT

Readers are invited to comment upon articles and other editorial material appearing in THE FOUNDRY. *The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief.*

THE EDITORS

On Right Track

TO THE EDITORS:

I would like to take this opportunity to express our commendation of your timely editorial on a Council of Associations of Foundries. Be sure that you include the foundries that are engaged in the manufacture of aluminum aircraft castings. I feel that you are on the right track in suggesting this procedure. We need such an association at this time; if for no other reason than to convince our people of the important part castings are taking in this war.

Some of our problems are terrific, and only by meeting and deciding on methods of general help to all can we hope to accomplish the purpose for which we are all working. Victory through co-operation.

G. H. STEIN, SUPERINTENDENT
FOUNDRY DIVISION
Acme Pattern & Tool Co.
Dayton, O.

Converter Practice

TO THE EDITORS:

Regarding the item in the November issue of THE FOUNDRY, the title of which is, "Wants To Know Cupola Mix for Making Converter Steel," and which appears on page 67, the question is: Can all steel scrap be used? The answer is yes. No pig iron is necessary but ferrosilicon must be added to the cupola charge as this element controls the temperature of the steel. Manganese is of no benefit in the converter, as it is all blown out by the action of the converter. It has a tendency to cut the lining of the converter. Carbon is picked up by the steel scrap in the cupola from the coke which is sufficient for good converter practice. Sulphur is taken care of by sodium carbonate. Practically all steel scrap is low in phosphorus, the composition coming from the cupola is of no importance, if it is low in phosphorus and sulphur, and contains enough silicon to bring the steel in the converter up to the desired temperature. All other elements are blown out of the converter during the process with the exception of nickel. All other alloys are added to the steel after it has been blown.

FRANK M. MEYERS
Aurora, Ill.

Simplify Pressure Ratings for Valves

New simplified practice recommendations listing simplified schedules of pressure ratings recommended for brass or bronze and iron body valves have been approved for promulgation, according to an announcement of the Division of Simplified Practice, National Bureau of Standards. The recommendations will be identified as Simplified Practice Recommendation R183-42, brass or bronze valves (pressure ratings), and Simplified Practice Recommendation R184-42, iron body valves (pressure ratings). They apply to steam rated gate, globe, angle and check valves, and will be effective for new production from Jan. 1.

Surveys of the industry showed that 97 per cent of all bronze or brass valves shipped in 1939 fell into

(*Concluded on page* 99)

Production-Minded SALES SERVICE

HEADS You Win!

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Record: An experienced foundryman. Joined Osborn sales organization in 1919.

Territory: Middle Western States with headquarters in Chicago.

Residence: 567 Anthony St., Glen Ellyn, Ill.

Twenty-three years of field service as an Osborn sales representative has given R. E. Kiefer a keen insight into foundry production problems. His suggestions are valued by many companies throughout the Middle West, because they know that his recommendations represent the combined experience of the entire Osborn organization and are based on a thorough knowledge of moulding practice as applied to today's production needs.

One of the many outstanding Osborn installations in Mr. Kiefer's territory is described on the next page. It consists of six Electric Type Jolt Rollover Pattern Draw Moulding Machines with Air Operated Jolt, one of which is illustrated at left. Like every Osborn unit, it offers many design and construction features that can contribute much to an "all out" production effort. For complete specifications write

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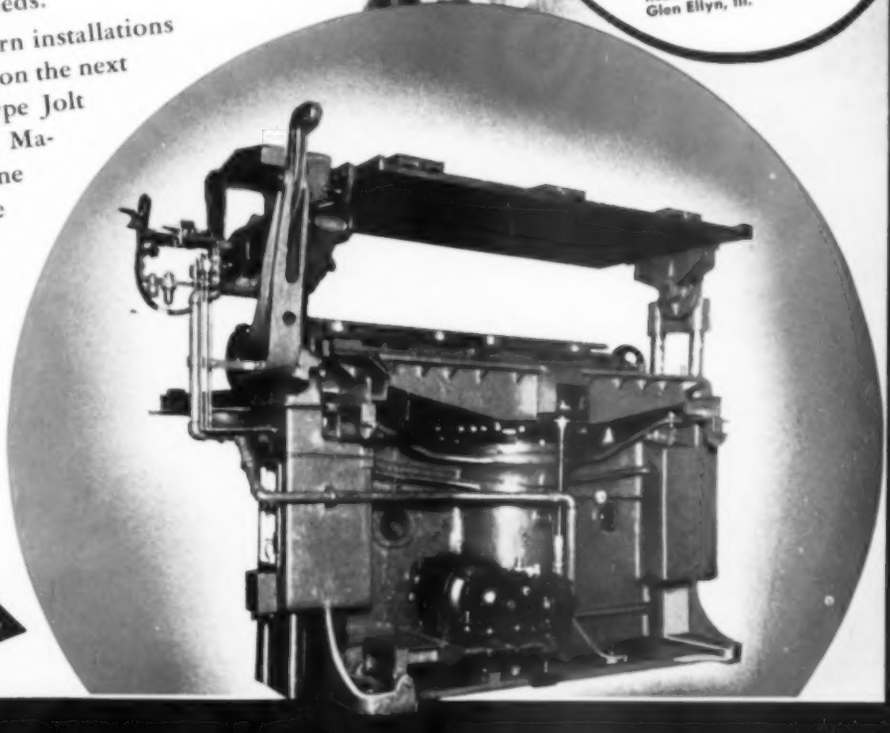

OSBORN

MOULDING MACHINES

Producing BIG MOULDS

With Greater Accuracy and Less Effort

The Harrison Steel Castings Company, Attica, Ind., is one of the country's largest steel foundries and a recognized expert in its field. In 1928 this company purchased its first Osborn Electric Type Jolt Rollover Pattern Draw Moulding Machine with Air Operated Jolt, to produce large size moulds with greater speed and accuracy. How well this machine did its job is evidenced by the fact that there are several such units now operating in the Harrison plant.

These machines are designed from the ground up to handle heavy loads, combine the economy and efficiency of air operated jolt with the smooth, positive motion of electric power, and offer such other important advantages as—

1. Compact assembly in one-piece cast frame.
2. Load handled and rolled over on approximate center of gravity in minimum space at maximum speed.
3. Draw parts are in position of greatest bearing area at start of draw operation, thereby assuring maximum accuracy.
4. Compact, one-piece foundation results in lower installation cost and controls complete alignment of machine.

Osborn Electric Jolt Rollover Pattern Draw Moulding Machines with Air Operated Jolt are offered in a range of sizes for handling these heavy-duty type moulds.

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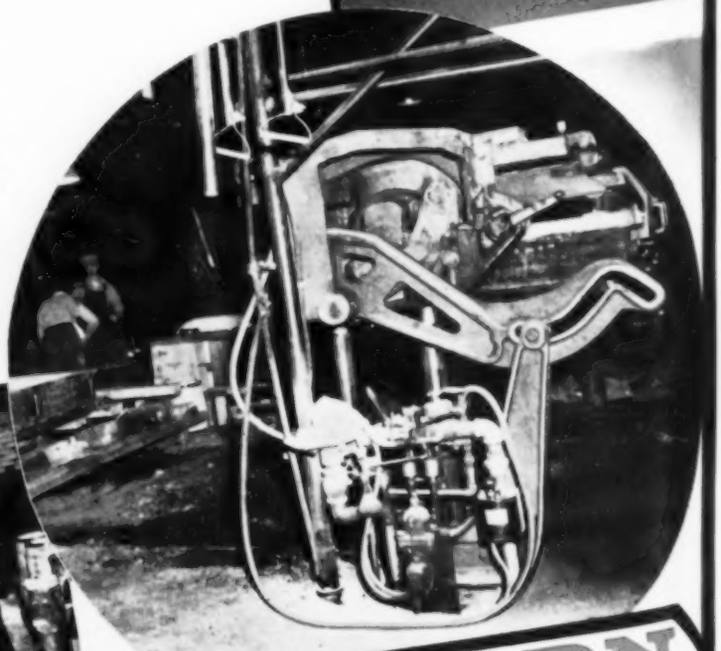

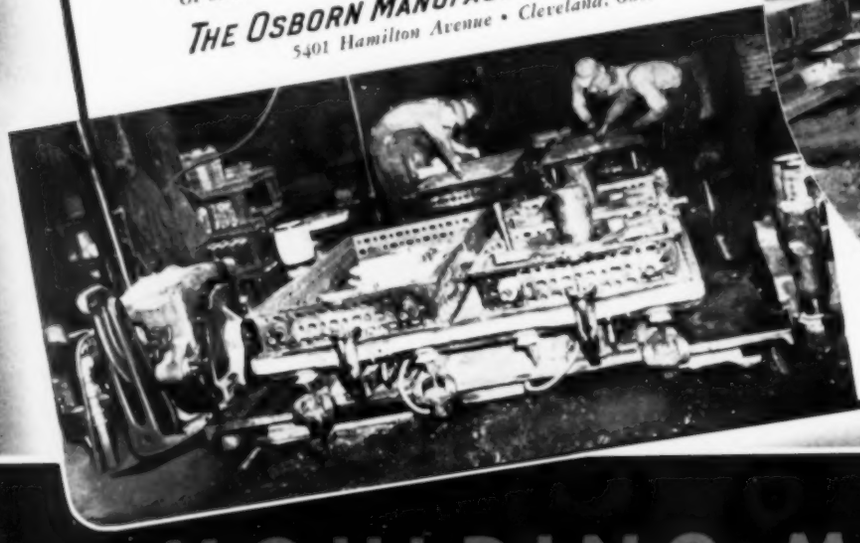

OSBORN

MOULDING MACHINES

(*Concluded from page 96*)

one of the 5 pressure classifications, whereas the other 3 per cent of shipments were distributed over 6 other pressure classes. Likewise 95 per cent of all iron body valves shipped fell in 3 pressure classifications, whi'e 9 other pressure ratings enjoyed between them only 5 per cent of demand. The simplified schedules recommend the continued manufacture as regular stock of valves in only those pressure ratings enjoying substantial consumer demand. Bronze or brass valves size ⅛ to 3 inches inclusive, are recommended to be stocked only in 100-, 125-, 150-, 200-, and 300-pound steam working pressure; iron body valves, size 2 to 12 inches inclusive, in 125-, and 250-pound, and size 3-inch and smaller in 150-pound steam working pressure.

Until printed issues are available, mimeographed copies of these recommendations may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington.

Obituary

Eugene L. LeBaron, 72, head of the E. L. LeBaron Foundry Co., Brockton, Mass., died Nov. 20. Formerly operating a foundry at Middleboro, Mass., he moved to Brockton many years ago, the foundry specializing in cast iron parts and fittings for municipal services.

* * *

Cecil E. Furry, 39, general superintendent, Federal Foundry Supply Co., and its subsidiary, the Wyodak Chemical Co., Cleveland, died Nov. 26 in that city.

* * *

Edmund B. Keane, 57, vice president in charge of sales Walworth Mfg. Co., New York, died Nov. 29 at his home in Pelham, N. Y. He had been with Walworth 35 years.

* * *

Mortimore F. Dunn, 55, for many years production supervisor, Milwaukee Malleable & Gray Iron Works, Milwaukee, died Nov. 22 at his home in that city.

* * *

Hugh H. MacMurray, 74, owner and operator of the Plainfield Brass Foundry, Plainfield, N. J., for 30 years, died Nov. 11 at his home in that city. Mr. MacMurray has been retired for several years.

* * *

John E. Williams, 81, owner of the Springfield Foundry Co., Pittsburgh, died Dec. 1. He was active head of the business which he founded 55 years ago. Mr. Williams was born in Wales and he went to Pittsburgh when he was 18. He started work as a pattern maker at the Morris Foundry Co. and several years later founded his own company.

* * *

John P. O'Neil, 68, for 25 years president of the Western Foundry Co., Chicago, until his retirement six years ago, died Nov. 14 in La Canada, Calif., of pneumonia, following an operation.

* * *

William H. Winterrowd, 57, vice president in charge of operations, Baldwin Locomotive Works, Philadelphia, died Dec. 7 at Bryn Mawr, Pa., due to injuries sustained in an automobile accident.

* * *

Luman R. Dewey, 78, general sales manager, American Brake Shoe & Foundry Co., Chicago, until his retirement in 1934, died at his home in Cattaraugus, N. Y., Dec. 6. Mr. Dewey had been with the company 30 years.

* * *

W. E. Sault, assistant to general purchasing agent, American Brake Shoe & Foundry Co., New York, died Nov. 29 in that city. Mr. Sault specialized in the purchase of pig iron, scrap, steel, coal and coke. He had been with the company for 40 years.

* * *

Albert Pack, 50, chairman of the board, Continental Roll & Steel Foundry Co., East Chicago, Ind., and Detroit Seamless Steel Tubes Co., Dearborn, Mich., and a widely-known Great Lakes yachtsman, died Nov. 15 of a heart attack at his home in Chicago.

* * *

George M. Johnson, treasurer and a member of the board of directors, Reliance Foundry Co., Cincinnati, died Dec. 3, at his home in Dayton, Ky. at the age of 65. Mr. Johnson originated many devices and plans for speeding up operations in the core division of the foundry.

* * *

Mrs. Minnie Lindenau Arth, 70, president and treasurer, Arth Brass & Aluminum Castings Co., Cleveland, died Nov. 29 at her home in that city. Mrs. Arth had been head of the company since the death of her husband in 1920.

Increase Shown in Foundry Orders

Index of foundry orders for November, 1941, according to a report of the Foundry Equipment Manufacturers' Association, Cleveland, was 408.5 as compared with 403.8 in October. Index of orders for new equipment was 417.4 and for repairs 381.7. The index of 100 represents the monthly average of reported sales to metal working industries during 1937-38-39,

Will Show Exhibits For Subcontracting

Permanent exhibits or "market places," where manufacturers may see and examine samples of currently needed war equipment and parts, will be established in six major cities approximately by Jan. 1 and in a number of other cities shortly thereafter, according to Floyd B. Odlum, Director of the OPM Contract Distribution Division.

The Army, Navy, other government purchasing agencies and many large companies holding war contracts will break down war equipment into subassemblies and bits and pieces and exhibit these smaller items in the "market places." Manufacturers who have not yet obtained war work but believe they are qualified for it will be urged to visit the exhibit halls regularly. Displays will be changed often, items being taken out as manufacturers are found to make them and new parts or subassemblies put in their places.

Cities in which permanent exhibits will be opened between now and Jan. 1 include: New York; Chicago; St. Louis; Philadelphia; Cleveland; Detroit.

Cities in which permanent exhibits will be opened immediately thereafter include: Atlanta; Boston; Cincinnati; New Orleans; Pittsburgh; Seattle; Birmingham, Ala.; Buffalo; Kansas City, Mo.; Los Angeles.

Those next in line for exhibits include: Dallas, Tex.; Denver; Memphis, Tenn.; Milwaukee; Portland, Me.

A total of about 50 permanent exhibits will be established.

Book Review

Tool Design, by C. B. Cole; cloth 498 pages 5½ x 8¼ inches; published by American Technical Society, Chicago, for $4.50.

Fundamental principles of design as applied to tooling for production form the background of this volume. The tool designer is the link between the engineering department and the production job. He needs all the practical knowledge of the expert mechanic, coupled with inventive genius. His job is to select the machines and develop the tools that will produce piece parts at high accuracy and speed.

This volume is a companion text to a previous book, *Tool Making*, by the same author. It covers the same general field but stresses design rather than methods of making them.

Commodity Research Bureau, 82 Beaver street, New York, has prepared for distribution a 32-page booklet entitled "Social Security."

Activities of FOUNDRY GROUPS

Toledo

ON Dec. 5 some 60 foundrymen in Toledo and vicinity gathered at the Hillcrest hotel, Toledo, to witness the official recognition of their petition and acceptance as the twenty-second chapter of the American Foundrymen's Association. Robert E. Kennedy, secretary, A. F. A., welcomed the group as the newest and the "baby" chapter, and announced that the nominating committee had submitted the following for officers for the ensuing period: Victor E. Zang, Unit Cast Corp., Toledo, chairman; W. A. O'Brien, Electric Autolite Co., Fostoria, vice chairman, and Robert Jansen, Unit Cast Corp., secretary-treasurer.

For directors the following were nominated: Charles Carson, National Supply Co., Toledo; Ralph Binney, Binney Castings Co., Toledo; W. C. Adler, Ohio Steel Foundry Co., Lima; Roy A. Clark, Toledo Machine & Tool Co., Toledo; Leighton Long, Bunting Brass & Bronze Co., Toledo; Lester Brown, Magnesium Fabricators Inc., Adrian, Mich., and W. F. Erler, Modern Pattern Works, Toledo. No additional names being submitted, the officers and directors were declared elected by unanimous vote.

V. A. Crosby, chairman of the Detroit Chapter, spoke briefly welcoming the new sister chapter, and then Mr. Zang introduced C. E. Westover, executive vice president, A. F. A. who pointed out the value of participating in chapter activities, and presented to Chairman Zang, the official baby rattle gavel for possession until the formation of the next chapter. Mr. Zang announced that the next meeting of the chapter would be held on Jan. 9, and the speaker would be Norman J. Dunbeck, Eastern Clay Products Co., Eifort, O. He then called on Mr. Westover to speak cn "Applica-

(*Continued on page* 103)

About 60 foundrymen were present at the official formation of the Toledo Chapter. Upper left view shows Victor E. Zang, first chairman, and center shows C. E. Westover, A.F.A. executive vice president speaking to the group. Photos courtesy Sterling Farmer, Sand Products Corp., Cleveland

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"I NEED BALANCE IN SKATING" says *Bess Ehrhardt*, lovely Star of "Ice Follies of 1941"

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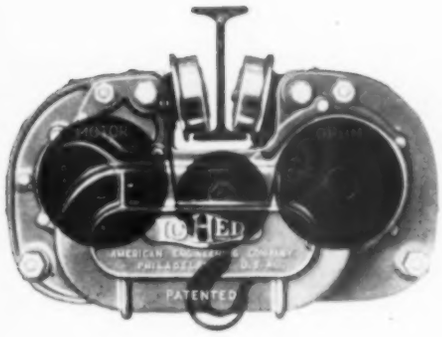
Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative.



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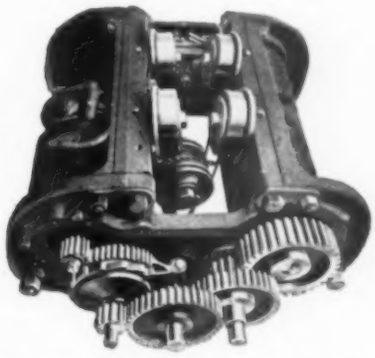
LO-HED, the *Balanced* Hoist. It's balance that makes the difference between a Lo-Hed and any other hoist. In this different hoist the motor and drum are on opposite sides of the beam. The hook goes up so close to the beam you can scarcely jam your thumb between. You get a compact, balanced hoist, minimum headroom, efficient spur gearing, and a sturdy frame, plus all the practical features a hoist should have. A Lo-Hed is worth a few dollars more but it will make a difference in your operating and maintenance costs. Look at a Lo-Hed and you won't have to look further. Write for Lo-Hed catalog today.



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It Costs Less To Operate—All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

It Costs Less To Maintain—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor, drum and gearing are easily removed.

It's Safe—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load from drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

It's Protected—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

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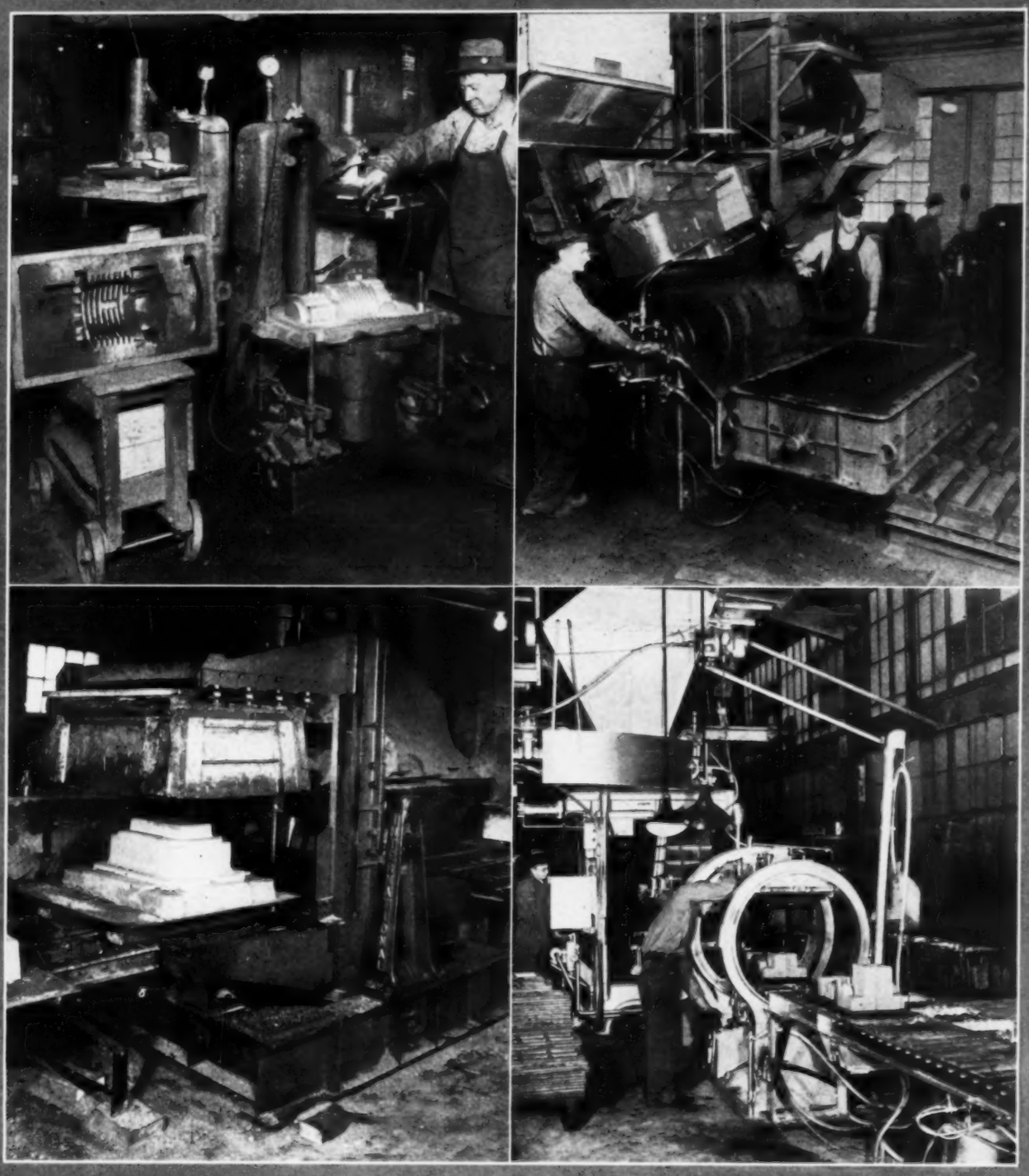

Upper left	Type PKL	Jolt, Squeeze, Power Pin Lift Machine
Upper right	Type F	Jolt, Power Turnover, Power Draw Machine
Lower left	Type AN	Air Clamp, Air Turnover, Air Draw Machine
Lower right	Type SB17	Core Blower and Type RED Machine for Clamping, Turning over and Drawing

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INTERNATIONAL MOLDING MACHINE CO.

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(*Continued from page* 100)

tion of Patterns to Miscellaneous Jobbing Work".

Mr. Westover described the use of a special type of plywood for mounting patterns, and pointed out that procedure was economical when 6 or more pieces were desired. To eliminate difficulties and secure accuracy in mounting split patterns he mentioned use of a piece of stiff cardboard the same size as the plywood board. The cardboard is placed between pattern and mounting board, and a sharp knife is employed to cut around the pattern contour. When the pattern is removed from the board, the central portion of the cardboard is punched out, leaving an opening conforming to the shape of the pattern. That piece of cardboard, flopped over is used to locate the other half of the pattern on another board.

Mr. Westover said that the plywood was a special type developed for mounting patterns and cost about 25 to 27 cents a square foot. It has a gum face and poplar center, and may be obtained in various thicknesses. The type he referred to was 27/32-inch thick since the rim or band around the mounting template was ¾-inch deep, and it was desired to have a slight sand crush on the mold face. The plywood is sawed into various sizes to fit different size flasks, and in one instance 20 different size boards are used. Actual pattern mounting may be done by boys with little supervision, at a comparatively small cost. —*Edwin Bremer.*

St. Louis

D J. REESE, International Nickel Co., New York, spoke on "Cupola Operations" at the Nov. 13 meeting of the St. Louis District Chapter, held at the DeSoto Hotel, St. Louis.

Some of the subjects touched upon by Mr. Reese were: High quality at low cost; elementary points in cupola operation; and effects of materials charged. At the same time he gave various charging mixtures and information as to fuel, carbon content, etc. Mr. Reese made a highly favorable impression upon the group and handled an excellent quiz program that followed.

Prior to the talk given by Mr. Reese, a welcome was extended to out-of-town guests among whom we were pleased to have R. E. Kennedy, secretary of the A.F.A. Of particular interest too, was the invitation given to the national organization to hold the 1943 convention in St. Louis.

Russell Hard, chairman of the entertainment committee directed attention to the annual stag party to be given at the DeSoto Hotel, Dec. 11. R. E. Williamson, chairman of the membership committee pointed out progress of the work done by that group.—*J. W. Kelin, secretary-treasurer.*

Ontario

FIRST group meeting of the Ontario Chapter for the present season was held at the Royal Connaught Hotel, Hamilton, on Nov. 28. Over 100 sat down to dinner at which Chairman N. B. Clarke, Steel Co. of Canada Ltd., presided. A brief entertainment program and the draw for attendance prizes preceded the division into gray iron, malleable, and nonferrous groups.

The gray iron group, under the leadership of Jack Stavert, Babcock-Wilcox & Goldie-McCulloch, Ltd., heard an excellent paper on "Raw Materials for the Cupola" by G. O. Loach, Otis-Fensom Elevator Co. Ltd., Hamilton. Mr. Loach discussed the contributions made to cast iron by pig iron, foundry returns and scrap metal, with particular reference to the present situation which is requiring increased consumption of scrap. In the utilization of larger proportions of scrap, one of the great difficulties is to secure closely graded materials.

Variations in scrap make close supervision of charges necessary to prevent trouble. Certain modifications in foundry practice may be necessary for the utilization of increased qualities of scrap but the attempt should be made to employ scrap with the least possible change in process. With larger proportions of sulphur in charges, more foundries may have to employ desulphurization procedures. Cupola operation was discussed briefly with the idea of stressing some of the points that should be watched in reducing pig iron consumption. In the foundry it is desirable to increase the scrap content of charges by gradual steps, thus assimilating substitution slowly. The whole program will require close and intelligent supervision, but there are compensations for the foundry in greater progressiveness, a quality that has too frequently been lacking in the business.

Malleable group under the leadership of R. C. Yates, Canadian Furnace Ltd., also discussed conservation of pig iron. It was agreed that the three principal possibilities were as follows: Use of gray iron scrap in air furnace charges up to from 6 to 12 per cent; duplex operation, melting first in the cupola and finishing in the air furnace; production of cupola pig iron by melting approximately 80 per cent steel scrap and 20 per cent gray iron scrap in the cupola, pigging it, and using the resulting pig in a portion of the air furnace charge in subsequent production.

An excellent discussion on brittleness of malleable iron by M. E. McKinney, International Harvester Co., of Canada, Ltd., led to the conclusion that if the chemical composition of white iron is silicon over 0.090 per cent, carbon under 2.80 per cent, manganese 1.7 times sulphur content plus 10 points, phosphorus under 0.20 per cent, chromium under 0.025 per cent, the cause of embrittlement is probably in the annealing process. In a discussion of physical properties for malleable iron, it was decided that it is comparatively easy to make malleable iron with tensile strength of over 50,000 pounds per square inch, but it is difficult to consistently keep the elongation over 15 per cent and the 18 per cent elongation referred to in handbooks is higher than is practical.

It was felt that the quality of test bars has a great deal to do with elongation properties and, especially when working in the neighborhood of 18 per cent elongation, solid test bars are essential. If the average batch type ovens go through the annealing cycle in 120 hours, the cycle is about as short as could be expected. Mr. McKinney believed the best packing material was a combination of seven parts air furnace slag with one part low grade iron ore, both prepared to pass through 1/12 to 5/8-inch screen and free of carbonaceous material. One of the most serious causes of unexpected annealing trouble is the inclusion of undesired carbonaceous material in the pack.

Under the leadership of O. W. Ellis, Ontario Research Foundation, the nonferrous group considered the recent work on porosity in tin bronzes published by T. F. Pearson and W. A. Baker, British Nonferrous Metals Research Association in the *Journal* of the Institute of Metals, August, 1941. Extensive tests were made to determine the influence of shrinkage and of dissolved gases on the incidence of porosity in tin bronze, using a closely controlled melting and casting technique. Bronzes are subject to dispersed shrinkage unsoundness by reason of the long freezing range of the alloys. They are subject also to unsoundness resulting from the evolution of hydrogen, water vapor, carbon monoxide, and sulphur dioxide, the extent of the gas porosity being much greater for the first mentioned two causes. Carbon dioxide and nitrogen are gases which are inert to the alloys.

Gas porosity generally takes the same form as shrinkage unsoundness except in grossly unsound castings where the cavities may appear approximately spherical in shape. The reaction between water vapor

and molten bronze is reversible and it is shown that oxidation and or deoxidation are effective for the purpose of preventing or minimizing unsoundness resulting from exposure of melts to moist atmospheres. The generally accepted practice of melting in slightly deoxidizing atmospheres is thus justified. However, the evidence indicates that elements with a high affinity for oxygen, such for example as phosphorus, will if present hinder the expulsion of reducing gases by oxidation.—*George L. White, secretary-treasurer.*

Detroit

AN INSPECTION trip through the Pontiac foundry, with the Pontiac Motor division as hosts, attracted 334 members to the Nov. 27 meeting of the Detroit Chapter, held at Pontiac, Mich. Arrangements for the meeting were made by Omer L. Allen, superintendent of the Pontiac foundry.

Following a steak dinner which was served in the Pontiac executives dining room, a clinical discussion of methods of operation and control in the Pontiac foundry was led by Z. T. Crittenden, chief plant metallurgist of the Pontiac Motor division. Mr. Crittenden, who has been active with Pontiac as a metallurgist since 1920, described the system evolved for obtaining maximum output for defense purposes which has entailed virtually continuous around the clock operation on a schedule of some 750 tons of iron per day. Mr. Crittenden also described the methods of handling materials including sand, hot metal, scrap and maintenance materials, some of which are unique with Pontiac.

Next regular meeting of the chapter will be held Jan. 15.—*A. H. Allen, secretary.*

Some views taken at the meeting of the Detroit Chapter at the Pontiac Motor division, Pontiac, Mich. Top shows Omer Allen, Pontiac's foundry superintendent greeting D. R. Wilson, Wilson Foundry. Center from left to right—Stanley Ostrander, Pontiac; Mr. Allen, and C. E. Westover, executive vice president A.F.A. Bottom shows F. J. Walls, International Nickel Co.; Mr. Westover and Mr. Allen examining a motor block

Chicago

STUDY of the current iron and steel scrap situation appears to offer foundrymen little encouragement that they will be able to obtain increased supplies during the national emergency. In fact, it seems probable that the shortage which has existed for some time will become more acute now that the country is engaged in shooting war and need for iron and production will increase.

At the regular monthly meeting of the Chicago chapter, American Foundrymen's Association, on Dec. 8, the gray iron, malleable and steel sections constituted themselves into a roundtable to hear E. G. Howell, John T. McEnroe Co., Chicago, analyze the present and future scrap situation. G. B. Stantial, Illinois Malleable Iron Co., Chicago, served as chairman.

Practically every foundryman, Mr. Howell asserted, has experienced difficulty in obtaining scrap. Some grades are almost nonexistent, and the volume of available grades is inadequate. As a result, melters have been obliged to take whatever they could get at the expense of efficient operations.

Mr. Howell cited four factors as responsible for today's shortage: (1) Unprecedented demand; (2) quick depletion of stocks after advent of the defense program because of large exports in recent years; (3) government pricing policies, which operate to impede collection of scrap; and (4) low production of steel ingots during the years 1932-35, reducing the volume of steel which should be reaching the scrap stage at this time. In explanation of the factor of unprecedented demand, it was pointed out that steel capacity has increased far more rapidly than pig iron capacity, thereby increasing the requirements for scrap.

Under the lend-lease program, which involves shipping large tonnages of semifinished steel abroad, we are losing considerable scrap. Ordinarily that steel would be finished here and the croppings and shearings would be available. Railroads are producing lower volumes of scrap because old equipment is being repaired and kept in service. Lack of adequate new steel for new construction forces rehabilitation of existing rolling stock.

Another interesting angle contributing to scrap shortage has to do with motor trucks. The bulk of new truck production is going to national defense, with the result that private truck operators are unable to purchase new ones to replace units that would normally be abandoned.

Viewing scrap expectancy, Mr. Howell said there may be a flow developed from farms. It is estimated that from ¼ to ½ ton can be found on the average farm and the Department of Agriculture is attempting to get this collected. It is believed 3,000,000 tons could be obtained from this source. What results can be obtained is problematical because the farmer believes the price he receives for his material too low. The price f.o.b. dealer's yard is far less than OPA price to consumers.

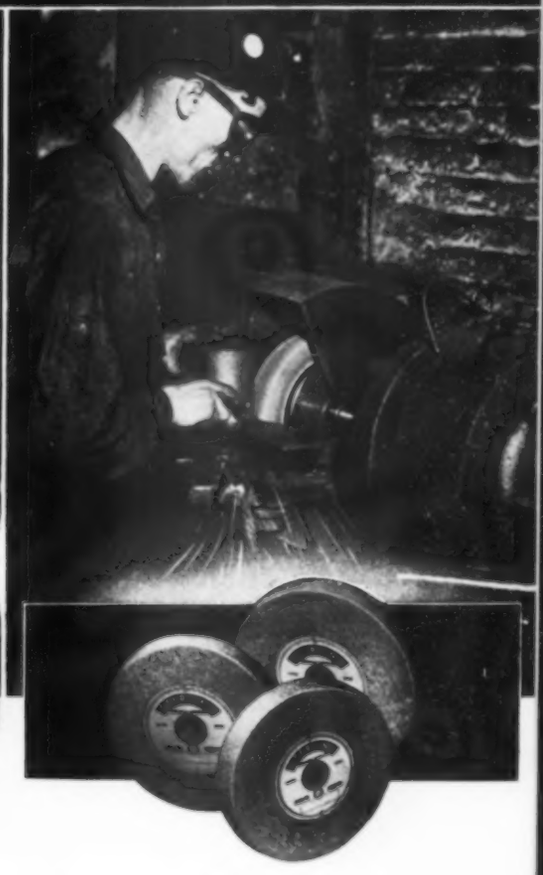
In the average year, automobile graveyards provide 2,500,000 tons of scrap and an effort is being made to increase this by 1,000,000 tons. But here again, an obstacle presents itself. With new automobile production being cut 50 per cent, old cars increase in value for spare parts, and yard operators fare better by holding parts for sale than to wreck cars for scrap. Wrecking costs are mounting, but scrap price remains fixed at low level.

As for removing old, buried street car rails in cities, Mr. Howell explained that the cost of removing the rails and resurfacing the streets considerably exceeds the scrap value of the rails. In concluding, Mr. Howell stated that despite widely-spread reports, 95 per cent of all scrap is being sold at legitimate prices, that is, within OPA price schedules.

The nonferrous group of the association heard C. V. Nass, assistant superintendent of foundries,

(*Continued on page* 107)

Here's Why STERLING GRINDING WHEELS Last So Long and Do A Better Job!



Grinding wheel users have two natural desires---that the wheel last as long as possible, and the best results be obtained.

A wheel cannot last indefinitely and still do a good grinding job. After the abrasive grains have become dull, they must be automatically released from the wheel's bond to expose the sharp, cutting edges underneath. Naturally, this limits the wheel's life.

If, however, the proper abrasive grains and bond have been used, the wheel will provide maximum performance, and give longest possible service . . which explains why Sterling Grinding Wheels are long lasting and turn out better-than-usual jobs. These "Wheels of Industry" can be quickly designed for the particular job you are doing. They have the correct bond, grain, shape, and size to turn out better work in record time, and are doing it in hundreds of industries.

Figures on Sterling Grinding Wheel performance are available . . ask for a Sterling engineer who will gladly explain them to you, show you how to use the wheels you already have in stock, and suggest what new Sterling wheels may be necessary. This service costs nothing, and will do much toward speeding up your wartime production . . write or wire us today.

Have you three books, "The Art & Science of Grinding", the Safety Code Book on Proper Grinding Procedure, and the new Sterling Catalog 40A? Ask for any of them on your letterhead, and they will be mailed immediately . . no obligation!

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GLOBE SENDS YOU

Season's Greetings

You've seen, no doubt, a thousand and one attempts to express in a novel and original manner the greetings customary at this season. Greeting card companies, advertisers, friends and relatives fall over backward trying to put over the old, old words in a new way. GLOBE IRON COMPANY cherishes no such desires for originality: we don't want to be fancy . . . we just want to say that we appreciate deeply the good will that has marked our dealings with the foundry industry; we thank our customers for their patronage; we are glad to have been of service. At the same time we wish to extend the season's greetings to all our foundry friends, wishing them a prosperous, successful New Year.

GLOBE IRON CO.

JACKSON, OHIO

(*Continued from page* 104)

Fairbanks, Morse & Co., Beloit, Wis., discuss "Cores and Test Bars." F. J. Eberhardt, Eberhardt & Wagner Co., Chicago, who is representing Chicago area nonferrous foundrymen on an Over-All Castings Committee, reported on a meeting of various trade associations in Cleveland. Clifford McKelvey, Chicago Hardware Foundry Co., North Chicago, Ill., presided over the nonferrous group.

Next meeting of the chapter will be Jan. 12, with Thomas Nelson, executive vice president and dean of the faculty, Dale Carnegie Course Corp., New York, speaking on "Human Relations."—*Erle F. Ross.*

S. California

PROCUREMENT of defense orders was the subject discussed at the Nov. 18 meeting of the Southern California Chapter, held at Scully's Restaurant, Los Angeles. Approximately 130 foundrymen and guests were present and George Emmett, Los Angeles Steel Casting Co., president of the chapter presided.

H. R. Washburne, Los Angeles Herald-Express, was the speaker. Mr. Washburne discussed at length the priority procedure and defense contracts, and urged the necessity of changing civilian production into national defense manufacturing. The talk was very interesting and instructive, and all present received valuable advice. Many questions were asked and there was a lively discussion which lasted way beyond the usual closing time.

The program was concluded with a motion picture showing war preparations in the United States and England.—*Earl Anderson, vice president.*

Twin City

NOVEMBER meeting of the Twin City Chapter was held Nov. 17, as the Midway club, St. Paul. Dinner was served at 6:30 p.m. to 53 members and guests. Following dinner the meeting was called to order by Chairman E. C. Madson. To promote acquaintanceship, at the roll call each one introduced the man on his right. Brief reports were given by Bob Wood for membership, Fred Quest for apprenticeship and scrap committees, and Fulton Holtby for the American Foundrymen's Association cupola research committee.

The speakers for the evening were J. Waldman of the F.B.I., and A. W. Gregg, of the Whiting Corp., Harvey, Ill. Mr. Waldman's talk was on, "The Work of the F.B.I." He explained the kind of work they are engaged in stressed particularly their duties with reference to the national defense program. Mr. Gregg talked on "Cupola Operation and Mechanical Changing." This was illustrated with slides. Two important points brought out during the talk were first, the importance of paying close attention to all the various details of operating a cupola from the cleaning out to the charging; and second, the importance of having a good intelligent cupola tender and paying him well for his services.

It was an unusually warm night for November and it was almost like taking off a second heat, but in spite of the heat it was a live meeting throughout and everybody remained to the end.—*O. W. Potter, secretary-treasurer.*

Central Indiana

TWO films were featured at the Dec. 1 meeting of the Central Indiana Chapter held at the Washington Hotel, Indianapolis. Approximately 75 were present and H. B. Harvey, chairman of the chapter presided. B. P. Mulcahy, Citizens Gas & Coke Utility, introduced Fred Hintze, Illinois Clay Products Co., Joliet, Ill., who presented the film, "Operation of a Clay Plant," and W. G. Twyman, A. P. Green Fire Brick Co., Mexico, Mo., who showed the film, "A Trip through the A. P. Green Fire Brick Co." Robert Langenskamp acted as discussion leader.

The first regular meeting of the chapter for the new year will be held Jan. 5. Charles W. Jones, general superintendent, William H. Block Co., will discuss, "Personnel Relations."—*R. A. Thompson, secretary.*

Detroit Chapter had one of the largest turnouts of members and guests at its recent meeting held at the Pontiac Motor division, Pontiac, Mich.

Birmingham

REGULAR meeting of the Birmingham District Chapter was called to order by Chairman J. A. Bowers at the Tutwiler Hotel, Birmingham, Nov. 21. T. H. Benners Jr., chairman of the apprentice training course committee, made a report on the apprentice meetings and the future programs. He urged all to attend and support the meetings. Report of the membership committee was made by A. S. Holberg. Twenty-three new applications were reported and the names of the new members were read by Chairman Bowers. He complimented the committee on its work, and a vote of thanks was given Mr. Holberg for his service. Chairman Bowers then called attention to the chapter's national meeting which is to be held Feb. 26. H. S. Simpson, national president of the association will be present.

(*Continued on page* 110)

One thousand members and guests attended the annual Christmas stag party of the Northeastern Ohio Chapter. Photos courtesy Sterling Farmer, Sand Products Corp., Cleveland

...the thing to do in '42

SAVE!

THE CLIMAX WIRE STRAIGHTENER

SAVING will be just as important in '42 as ever before. The tremendous defense demands for steel make it increasingly important that it be conserved whenever possible.

One of the best ways for a foundry to save on steel is to straighten and re-use core wires. Doing so is not only a considerable contribution to national defense—it's a real axe for cutting your costs!

To straighten wires economically, the operation must be fast and cheap, and that's where the Climax Wire Straightener comes to your aid.

The Climax is inexpensive to operate, and its low price makes it easy to buy. Its sturdy construction minimizes repairs.

The rolls and bushings through which the wires pass are of alloy steel, specially hardened to resist wear. Gears and bearings are larger than necessary, ensuring safety and long wear.

The Climax is safe for anyone to run. All moving parts are protected for the operator's safety. It does not require an experienced operator.

Write for circular today.

THE WONDER CUTTER

Cuts soft rod or wire up to ⅝" dia. and band iron up to ¼" x 2". Gauge for repeated cuts to same length. Sturdy and long-lived. The lowest priced Wire and Band Cutter on the market!

THE LOWE RIDDLE

The sifter with everything! You can put 6 tons of oil-based core sand through a Lowe every hour! Low first cost and practically no maintenance. Fully guaranteed. It will pay you to use a Lowe sifter.

THE FEDERAL FOUNDRY SUPPLY CO.

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CHICAGO—CHARLEROI, PA.—CHATTANOOGA, TENN.—DETROIT—MILWAUKEE—MINNEAPOLIS—NEW YORK—RICHMOND, VA.—ST. LOUIS.—UPTON, WYO.

(*Continued from page* 108)

The meeting then was turned over to Mr. Spencer who introduced the speaker for the evening, Fred B. Riggan, The Key Co., East St. Louis, Ill. Mr. Riggan gave an excellent talk with slides, and led in general discussion on sand control, mixes, and general foundry practice. Several questions were asked and were well answered, and the program was participated in by many members.—*H. G. Mouat, secretary-treasurer.*

Philadelphia

NOVEMBER meeting of the Philadelphia Chapter was held at the Engineers Club, Philadelphia, Nov. 14. There were 160 present. The Chairman, Harry Reitinger, U. S. Pipe & Foundry Co., Burlington, N. J., presided.

The after dinner speaker, Victor L. Short, president, Institute of Human Science, is widely known as "The Man with the Million Dollar Mind." His talk on human science and memory demonstrations was an outstanding feature.

The main speaker was Frank G. Steinebach, chief of the Foundry Equipment and Supplies unit, Tools section, Division of Production, Office of Production Management, and editor of THE FOUNDRY. Mr. Steinebach's talk on priorities, allocations and problems involved, was most timely and interesting. He pointed out the importance of the foundry industry in defense, as 86 out of approximately 150 orders issued by OPM affect that industry.

December meeting of the Philadelphia Chapter was held Dec. 12 at the Engineers Club. Dinner was served to approximately 100 members and guests. Chairman Harry Reitinger, U. S. Pipe & Foundry Co. presided. The first speaker, Charles Grakelow, director of purchases and supplies, city of Philadelphia and a member of the mayor's cabinet, was introduced by Lee Harris, Link-Belt Co. He gave a timely and interesting talk on the defense activities and plans in Philadelphia for the present emergency.

The technical session was devoted to "Sand." A color motion picture with sound was presented by Whitehead Bros. Co. The picture shows the origin, preparation of sand and its application in foundries. It is unique since it starts at the very beginning — showing the effect of glaciers and erosion, grinding up materials of the mountains to a fine powder which is washed by melting glaciers into the valleys and streams. After covering the geological history, many of the natural deposits in the Eastern section of the country are shown being mined, graded, processed and then shipped to the consumers.

A discussion on sand problems followed the showing of the picture, questions being answered by a committee composed of representatives of various sand companies including: Louis Dill, George F. Pettinos Co., B. E. Belden, Whitehead Bros. Co., J. Mentzer Taggart & Co., H. J. Williams, New Jersey Silica Sand Co. and H. Mandel, Pennsylvania Foundry Supply & Sand Co.

H. S. Simpson, president of the American Foundrymen's Association, met with the executive committee of the Philadelphia Chapter at the Hotel Philadelphian Dec. 4. Dinner was served, after which Mr. Simpson discussed future plans and activities of the association.

Next meeting of the chapter to be held Jan. 9 at the Engineers Club will feature nonferrous night. The speaker will be D. Frank O'Connor, Walworth Co., Boston.—*B. H. Bartells, chairman, publicity committee.*

John P. Kelly, John P. Kelly Brass Foundry and George Street, Ajax Metal Co., both members of the Philadelphia Chapter, seem to be discussing some weighty problems. Photo courtesy William B. Coleman, W. B. Coleman Co., Philadelphia

Metropolitan

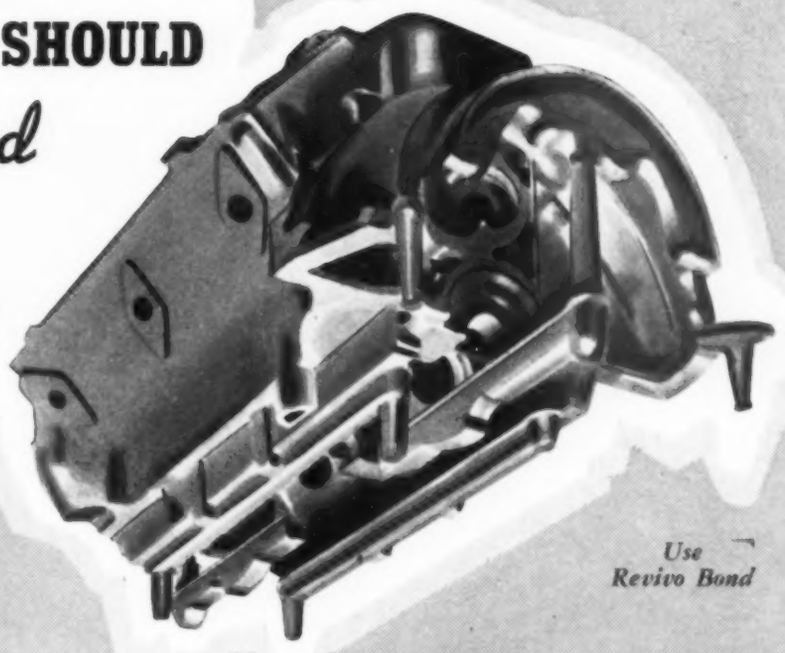
A SPLENDID turnout welcomed H. S. Simpson, national president of the A. F. A. as guest at the Dec. 1 meeting of the Metropolitan Chapter, held at the Essex House, Newark, N. J. The meeting was the annual Equipment Night, at which four 15-minute talks were presented on mechanized foundry equipment. The speakers were W. R. Bean, vice president, Whiting Corp., now with the OPM, who spoke on foundry furnaces; W. A. Kellogg, National Engineering Co., who discussed sand preparation equipment; W. H. Nichols, W. H. Nichols Co., whose topic was molding machines; and J. Rigby, American Foundry Equipment Co., who spoke on casting cleaning equipment. Fred Mosley, Whitehead Bros. Co. acted as technical chairman.

President Simpson, who said a few words after dinner, stressed the need for educational programs on all types of foundry practice because of the rapid expansion of the profession for national defense. Mr. Bean pointed out the need for accurate control of raw materials in order to obtain peak production from small cupola installations. Hot blast cupolas must produce at least 10 to 12 tons of metal per hour over a six to eight hour day to be practical. Mr. Kellogg showed slides of equipment for sand handling which were divided into three groups; namely, cleaning, preparing and handling. Mr. Nichols recounted the manufacture of molding machines, the first of which was made in 1869.

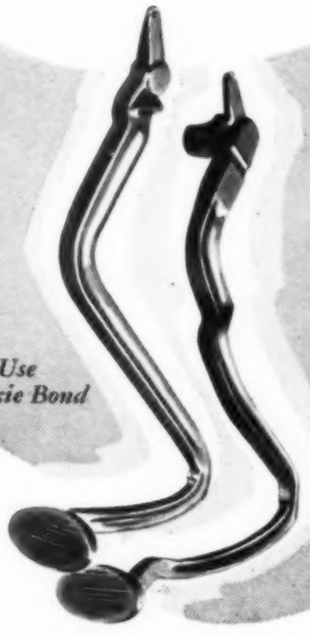
Since the first crude machines, great strides have been made in improving their operation, life and precision. Mr. Rigby discussed blasting equipment, both air blast and airless, room type and tumbler design.

(*Continued on page* 112)

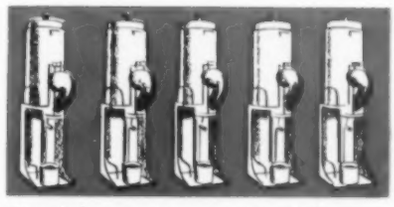
The Same BONDING CLAY SHOULD *NOT be Used* ON THESE *2* JOBS!



Use Revivo Bond



Use Dixie Bond



Five laboratories are at work for us—and you—to assure you of the best results from our five bonding clays.

For the malleable brake pedals on the left you should use Dixie Bond in order to get high collapsibility. For the cylinder block on the right use Revivo Bond to keep your costs down . . . Type of metal, shape, size, weight and other aspects of casting requirements make a big difference in the bonding clay you should use, but they constitute no puzzle to the "ECP" service staff. Any requirement in green, dry or hot strength can be satisfied, and *satisfied exactly*, by "ECP" bonding clays employed separately or in combination . . . as recommended by five full-time "ECP" service engineers . . . in accordance with the findings of five laboratories engaged in "ECP" research. *No one bonding clay can possibly make all jobs equally well . . .* We continue to ship all orders within 24 hours.

EASTERN CLAY PRODUCTS, INC., EIFORT, OHIO

DIRECT SALES OFFICES: *Detroit*—510 United Artists Building; *Buffalo*—228 Highgate Avenue; *Philadelphia*—6483 Morris Park Road; *New England Office*—33 Bass Street, Wollaston, Mass. AGENTS: Milwaukee—Walter Gerlinger, Inc.; Chicago—Western Materials Co.; Chattanooga—Porter Warner; Los Angeles—H. C. Donaldson & Co.; San Francisco—H. C. Donaldson & Co.; Montreal—Webster & Sons, Limited; Minneapolis—E. R. Frost & Co.; London—District Chemical Co., Ltd.

Authorized to license foundries under Hanley patent 1657573

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

All TYPES OF BONDING CLAYS

(*Continued from page* 110)

The choice of equipment depends on the type and size of the castings made. Room blast equipment should not be larger than necessary since it would require a larger ventilating installation and a greater quantity of grit to carry on the work.

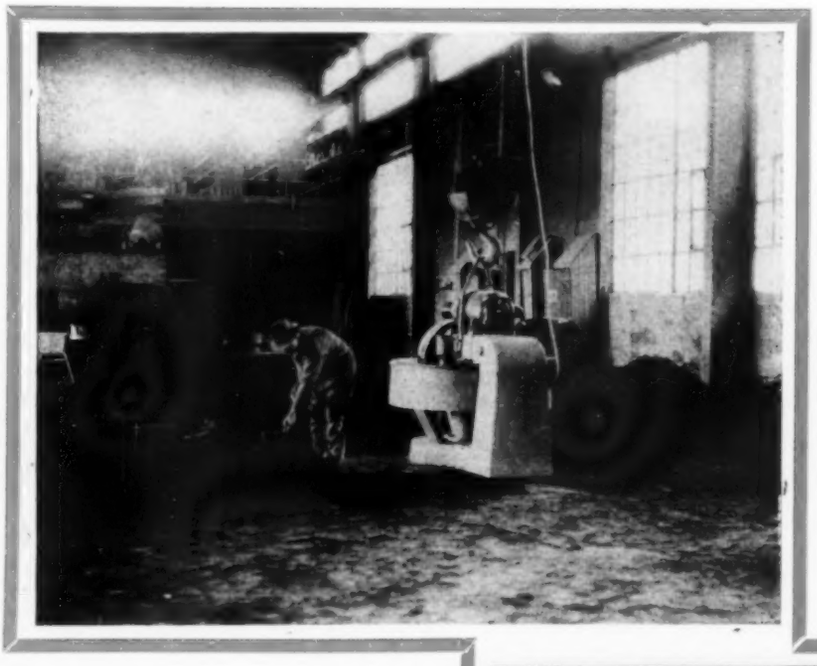
It was announced that the next meeting of the chapter will be held Monday, Jan. 5. The subject will be "Nonferrous Castings in Shipbuilding."—*R. E. Ward, assistant chairman of the publicity committee.*

N.E. Ohio

AS usual attendance at the Northeastern Ohio Chapter's annual Christmas stag party held on Dec. 11 was limited by the dinner seating

(*Continued on Page* 114)

An excellent dinner and floor show was enjoyed by those attending the Christmas party of the Northeastern Ohio Chapter. Photos courtesy Sterling Farmer, Sand Products Corp., Cleveland



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. . . OR BUILD IT INTO YOUR SAND SYSTEM LIKE THIS

★ ★ ★ ★ The Little CLEARFIELD 404 will serve you faithfully and well either way. You need something bigger? O.K. Tell us how much sand you want to mix . . . we have the mixer.

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CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

(*Continued from page* 112)

capacity of the Rainbow Room, Carter hotel, Cleveland, which is the largest of its kind in the city. However, 1000 members and guests were present and enjoyed an excellent turkey dinner which was followed by a topnotch floor show arranged under the direction of L. P. Robinson, chairman of entertainment.

Feature of the meeting was the dispatching of a telegram voicing the sentiment of all present. It was as follows:

Donald M. Nelson,

Director SPAB

New Social Security Bldg.

Washington, D. C.

We, one thousand foundrymen attending the December meeting in Cleveland, pledge our whole-hearted support and co-operation to you, SPAB and the government of the United States in our "all out" war effort with the Axis powers. We will "Remember Pearl Harbor."

(Signed)

Northeastern Ohio Chapter of the American Foundrymen's Association.

Chairman Robinson reminded those attending that the 1942 convention and exhibition of the national association would be held in Cleveland on April 18 to 24, and that it would be the greatest ever held. — *Edwin Bremer, chairman publicity.*

Chesapeake

IF YOU weren't at the second annual get-together party of the Chesapeake Chapter held Dec. 6, you missed a real treat. The 200 members and guests who were present will agree that the entertainment committee, headed by L. H. Denton, chapter secretary, again presented a fine evening of fun and fellowship. The program included a six-act floor show, buffet lunch and refreshments.

The chapter was particularly honored by the presence of H. S. Simpson, national president of the A.F.A., and president, National Engineering Co., Chicago, who participated in the executive meeting of the chapter at 6:30 p. m. as well as the social event which followed. Mr. Simpson advised that his contribution to the success of the foundry industry will be to promote a nationwide campaign to advertise the use of castings by acquainting engineers and users of castings with the opportunities they afford. This publicity campaign will be supplemented by a technical movie which will be available for exhibition to organizations, students in engineering schools and various other groups, and will serve as a background in promoting the use of the type of castings which will best serve any particular purpose. A booklet written in language that the layman can understand describing the use of castings will be available for distribution with the showing of the picture. All feel that the program will be an outstanding event in the history of the A. F. A.

Next meeting of the Chesapeake Chapter will be held Jan. 23 at the Engineers Club. The technical session will include a round table discussion of gray iron, steel and nonferrous castings. The discussions will be led by the following members of the chapter: R. T. Covington, American Hammered Piston Ring division, Koppers Co., Baltimore, gray iron; J. E. Crown, Naval Gun Factory, Washington, steel; E. W. Horlebein, Gibson & Kirk Co., Baltimore, nonferrous. Come out boys and get an earful. Bring your problems along. You may get the solution and others may benefit by your questions.—*Frederick Bruggman, reporter.*

New England

LAST meeting of the New England Foundrymen's Association of the current year was held at the Engineers' Club, Boston, on Dec. 10. There were 80 members and guests present. The speaker was S. C. Massari, metallurgist, Association of Manufacturers of Chilled Car Wheels, Chicago, and the subject of his discussion was "Combustion Control in the Cupola".

In speaking of fuels, namely coke and charcoal, he explained that there is a definite relation between the temperature of the fuel and the percentage of it that will burn. As the fuel is burned more efficiently, the greater the loss of manganese and silicon in the charge, so it is necessary to determine the point where the greatest efficiency is obtained. In one of the charts which was shown, 13.5 per cent carbon dioxide gave the most economical melting where the cost of the coke and cost of coke plus silicon and manganese loss was determined from figures available.

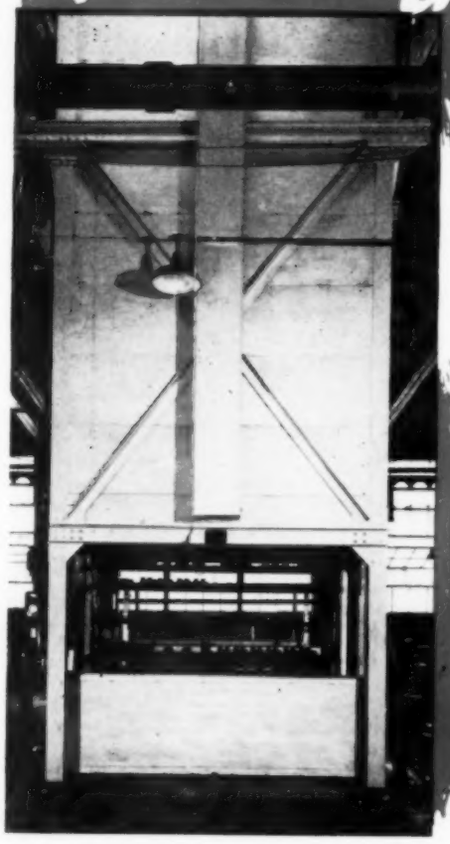
The speaker showed the advantage of having a carbon dioxide recorder operating in conjunction with the cupola and said that with that instrument an analysis of the gases every 2 or 2½ minutes would bring considerable saving. Naturally each cupola is a different problem in itself, and the best point of operation must be determined in each case. He showed the effect of the time that iron is held in the ladle upon the graphitizing of the iron. He also showed how tellurium in small amounts and under careful supervision can be used as a carbide stabilizer. Metallic tellurium made into tablets is used and as little as 6½ grams per ton of metal is effective. An interesting collection of charts and graphs were put on the screen illustrating the many points Mr.

(*Continued on page* 117)

Chesapeake Chapter's second annual get-together party held on Dec. 6 was a huge success. Photos courtesy Frederick Bruggman, Gibson & Kirk Co., Baltimore, Md.

CARL-MAYER CORE OVENS

Average more than 3 Repeat Orders per customer



A FEW USERS OF CARL-MAYER OVENS . . .

ALUMINUM CO. OF AMERICA
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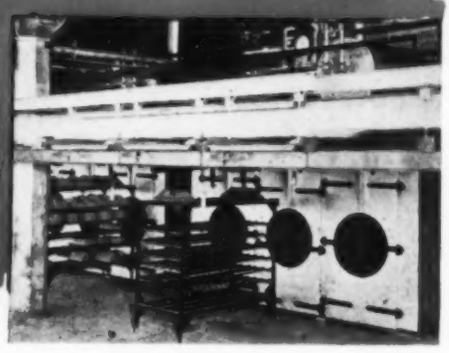


Typical large Carl-Mayer Vertical Oven as installed for Electric Autolite, Fremont Foundry, Cadillac, General Motors and Packard Motor Co

Part of large Carl-Mayer Recirculating Gas Fired Rack Type Oven installation at The General Electric Co.

Another large Carl-Mayer Monorail Type Conveyor Oven (like this) for Eclipse Aviation Magnesium Plant

Carl-Mayer Results show all around savings . . . from 25 to 50%

Some cases over 100%

Carl-Mayer speed, efficiency and fuel economy are engineering achievements geared up to the ever-present demand for bigger production, better production—at lowest cost for fuel and operation.

Carl-Mayer Ovens are built in a type and size for every foundry need. Write for Bulletin 141—or write us to send an engineer to SHOW you how much you can speed up production and cut costs with Carl-Mayer Oven Equipment.

Core Ovens **THE CARL-MAYER CORP.** Mold Ovens
3630 Euclid Ave., Cleveland, Ohio
(Over 20 Years' Experience)

WHERE TO, SOLDIER?

THEY gave him a pass today, for the week-end.

The world is his—at least as far as the nearest town. No more K.P., no more drill, no more formations till Monday. He can be John American, his own master, having a good time. That pass is his *open sesame.*

But is it?

Where will he and his buddies go in that town overrun with soldiers? Where will they eat and sleep? What can the community do to give them relaxation and entertainment?

• • •

One of the forgotten problems in any high-speed scheme of national defense is how to provide for the soldier and sailor off duty.

Within the camps and naval stations the services themselves have excellent facilities. But in the surrounding cities and towns the problem is acute and difficult.

Many of the newer army camps are located far from the larger centers. Into towns of 1,000 to 5,000 population may come as many as 3,000 men on a single evening. Where are they to go? How is the community to provide for them, to see that they get the wholesome food and entertainment that all of us would like them to have?

To meet this emergency all the "service agencies" of the last war have joined forces. The Y. M. C. A., the National Catholic Community Service, the Salvation Army, the Y. W. C. A., the Jewish Welfare Board and the National Travelers Aid Association have combined to form the United Service Organizations—known as the U. S. O. Differences of race and creed have been forgotten; lesser distinctions have been subordinated to the idea of united service.

How can you help? The U. S. O. is raising approximately eleven million dollars to finance its program of leisure-time aid to the men in service. This is your opportunity to do your bit for national defense. Give generously to the U. S. O.

How will the money be used? In maintaining 360 U. S. O. clubs. The government is building the club houses themselves. What is required now is money to operate them.

How and where shall you give? To the local committee that has charge of your city's part in this national drive. No matter how much or how little you feel you can give, send it today to your local chairman or to National U. S. O. Headquarters, Empire State Building, New York.

(*Continued from page* 114)

Massari described during his address.

A nominating committee consisting of following was appointed: Francis LeBaron, E. L. LeBaron Foundry Co., Walter Saunders Jr., Walter Saunders Co., and Henry Jensen, General Electric Co. This committee will nominate the list of officers for 1942 and report at the next meeting, which will be the annual meeting of the association and will be held at Hotel Gardiner, Boston, Jan. 14. The meeting will include the reading of the annual reports and election of officers. A dinner will precede the meeting and an entertainment will follow the business session.—*M. A. Hosmer.*

Wisconsin

HUNTING season and Thanksgiving celebrations were not enough to hold down the attendance at the Nov. 21 meeting of the Wisconsin Chapter at which 240 members and guests were treated to a complete evening.

President A. C. Ziebell introduced Duncan Forbes, national vice president of the A.F.A. who advised the membership concerning some of the recent moves of the national organization. Mr. Forbes stated that the government has encouraged the A.F.A. to hold an extensive foundry exhibit in 1942. It will be held in Cleveland from April 18 to 24. An exceptionally large Army ordnance exposition will be held in conjunction with the show. This combination should produce the largest foundry display of all times. Executive Vice President C. E. Westover also was introduced to the members by Mr. Ziebell.

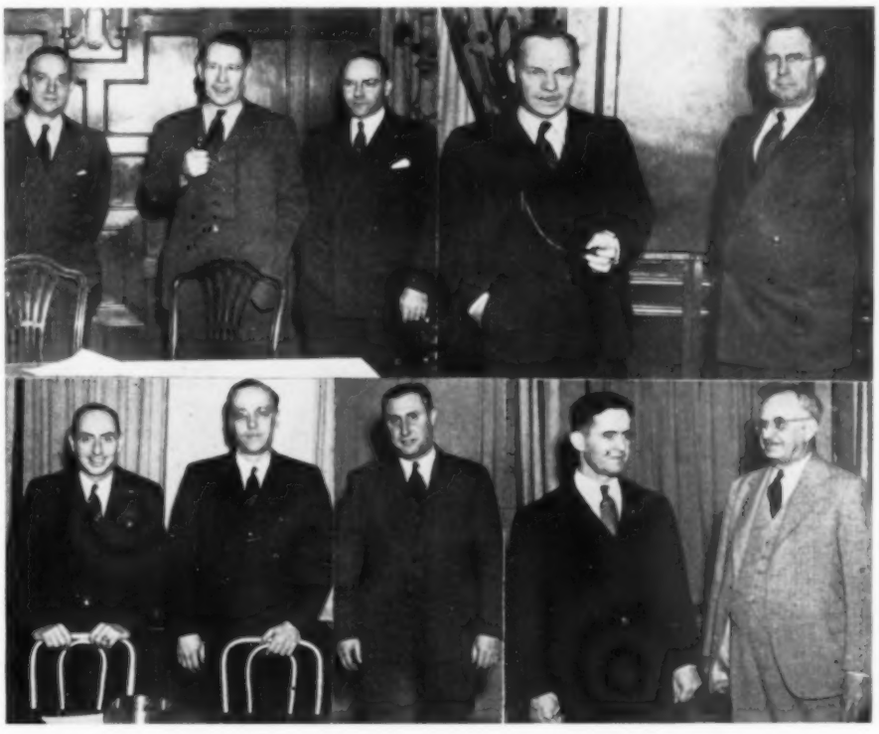
Bill Hambley, chairman of the membership committee introduced 32 new members into the good-fellowship of the Wisconsin Chapter. Mr. Hambley also recorded the fact that the Wisconsin Chapter now has 378 members. A sound slide film titled, "The Design of Steel Castings" was shown through the courtesy of the Steel Founders' Society of America, after which the meeting divided into groups.

Under the direction of Frank Kulka, general superintendent, Motor Castings Co., who acted as chairman, the gray iron section heard the interesting subject of "Engineering Viewpoint on Design of Gray Iron Castings," by R. A. Beckwith, chief engineer, Koehring Co., Milwaukee. The starting point of a desirable and profitable relationship between engineer, foundryman and patternmaker, three distinct personalities in their own right, each knowing his own profession, was one of the serious problems tackled by Mr. Beckwith. His opinion that isometric drawing should be used in conjunction with accepted blueprints because better conception of a pattern or casting is obtained, met the approval of the large group present. Mr. Beckwith's thorough discussion on reasons for use of certain design sections, their desirability and advantage over incorrectly designed sections compared with advancements made with physical properties of cast iron was well received. The resultant effect on castings proves without question that when engineers thoroughly consider problems and join hands with foundrymen and patternmakers, all three shall profit through lower costs, better design and better castings.

Approximately 35 attended the malleable meeting with J. B. Gutenkunst, Milwaukee Malleable & Gray Iron Co. acting as chairman. A paper on melting practice was given by J. Arthur Durr, development engineer, Malleable Founders' Society, after which he led the discussion. Mr. Durr described his experience with a pulverized coal melting unit the burners of which were set at about a 10-degree angle instead of the usual 21-degree angle. He indicated many advantages that could be gained if such equipment could be revised. This created considerable discussion and Mr. Durr, upon request for copies of his paper advised that they would be available at a later date.

The nonferrous section, with Walter W. Edens, metallurgist, Ampco Metal Inc., as chairman, devoted the evening to a scrap clinic, led by C. V. Nass, Fairbanks-Morse Co. Mr. Nass discussed briefly the common causes of casting defects occurring in nonferrous foundry practice. After which the meeting was thrown open for general discussion. Many problems, some of them concerning castings which had been brought to the meeting, were taken up by the group for suggestions as to proper means of overcoming production difficulties.

"Welding of Steel Castings" was the subject presented by Clinton Swift, weld-engineer, Ampco Metal Inc. to the steel group. Fred Pritzlaff, foundry superintendent, The Falk Corp., was chairman. Various problems encountered in repair welding of carbon and alloy steel castings by the electric arc method were discussed by the speaker. Main topics of his talk were the choice of suitable electrodes, proper welding technique, the advantages of preheating and the desirability of stress relieving after welding. Slides were shown illustrating the procedure followed in fabricating large units made up of castings and structural members.—*George K. Dreher, secretary.*



Individuals shown in the accompanying views participated in the Nov. 21 meeting of the Wisconsin Chapter. Upper row left to right—J. B. Gutenkunst, Milwaukee Malleable & Gray Iron Co.; J. A. Durr and R. Anderson, Belle City Malleable Iron Co.; Frank Kulka, Motor Castings Co., and R. A. Beckwith, Koehring Co. Bottom row—C. V. Nass, Fairbanks, Morse & Co.; Walter Edens, Ampco Metal Inc.; Nels Spidell, Sand Products Corp.; B. Koch and Fred Pritzlaff, Falk Corp. Photos courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee

John H. Tressler, vice president of Northeastern Ohio Chapter, introduces Bradley H. Booth, Jackson Iron & Steel Co., who spoke at the Nov. 14 meeting. Photo courtesy Sterling Farmer, Sand Products Corp., Cleveland

Western Mich.

WESTERN Michigan Chapter held its regular monthly meeting Dec. 1 at the Ferry Hotel, Grand Haven, Mich. About 125 foundrymen were present for the dinner and floor show, and for the meeting which followed.

Program chairman, A. E. Jacobson, Grand Haven Brass Co., introduced the speaker of the evening, R. H. Khuen, Amplex division, Chrysler Corp. Mr. Khuen gave a very interesting talk on "Powder Metallurgy" including the origin of the idea, importance of the industry at present in connection with the defense program and prospects for improvement of the art in the future. The talk was well illustrated with parts produced by the Amplex division.

It was announced by Mr. Jacobson that the next meeting would be held Jan. 5, at the Occidental Hotel, Muskegon, Mich. with two speakers for the occasion. E. E. Woodliff, Harry W. Dietert Co., Detroit will speak on moldings and problems to the ferrous group and William Romanoff, H. Kramer & Co., Chicago, will speak on foundry practice to the nonferrous group.—*Max A. Amos, secretary-treasurer.*

Cincinnati

SEVENTY members and guests attended the Nov. 11 meeting of the Cincinnati District Chapter held at the Cincinnati Union Terminal restaurant to hear John W. Bolton, metallurgist, Lunkenheimer Co., Cincinnati, discuss, "Practical Approaches to Some Nonferrous Foundry Problems."

In introducing the speaker, Chairman William Ball Jr., explained that because of Mr. Bolton's wide experience both in nonferrous and in ferrous foundries, the talk would not be limited strictly to nonferrous problems. Mr. Bolton presented a wide variety of foundry problems and answers in an interesting manner.

One general problem which Mr. Bolton suggested, quite apart from melting, was that the Cincinnati chapter and the A. F. A. undertake as a project the elimination of restrictive government specifications which unintentionally hamper production without improving the quality of the metal.—*Henry M. Wood, secretary.*

Top view shows Wisconsin Chapter's committee for its annual regional conference to be held next month, and includes left to right—R. F. Jordan, Sterling Wheelbarrow Co.; Prof. J. F. Oesterle, University of Wisconsin; Harry E. Ladwig, Allis-Chalmers Mfg. Co.; A. C. Ziebell, Universal Foundry Co., and Howard Waldron, Nordberg Mfg. Co. View below was taken at the Nov. 11 meeting of the Northern Illinois-Southern Wisconsin Chapter, and shows left to right—D. P. Forbes, Gunite Foundries Corp.; H. O. Quarty, Allis-Chalmers Mfg. Co.; H. S. Simpson, president, A.F.A.; C. E. Westover, executive vice president, A.F.A., and Fred Rundquist Jr., Beloit Castings Co. Photos courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee

Meehanite Group Holds Meeting

Nearly 100 members of the Meehanite Research Institute of America, Inc., attended the thirteenth annual meeting of the group which was held at Wade Park Manor, Cleveland on Nov. 6, 7, and 8. Some 35 research papers pertaining to recent developments in foundry and metallurgical practice were presented and discussed.

Officers of the group elected for 1942 include: President, Oliver Smalley, president, Meehanite Metal Corp., Pittsburgh, Pa.; vice president, H. B. Hanley, American Laundry Machinery Co., Rochester, N. Y., and secretary-treasurer, Frank M. Robbins, president, Ross-Meehan Foundries, Chattanooga, Tenn.

A gold watch, suitably engraved, was presented by the Institute to A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland, for meritorious service.

Metropolitan Gives Foundry Courses

Three tuition-free foundry courses are being conducted at the Cleveland High School, Elizabeth, N. J., by Rutgers University, New Brunswick, N. J., in co-operation with the Metropolitan Chapter of the A.F.A., with Donald J. Reese, chairman, educational committee.

The course, "Metallurgy and Metallography of Cast Metals" is being given Thursday nights by Roy M. Allen, consulting metallurgist, Bloomfield, N. J., and Dr. R. A. Flinn, metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J. The course "Melting of Metals for the Foundry" is being given Tuesday nights, under the supervision of F. G. Sefing, International Nickel Co., New York, and formerly professor of metallurgy, Michigan State College. The lectures will be given by specialists in the various fields. "Foundry Materials" is the subject of the third course, and it is being given Wednesday nights under the supervision of R. E. Nesbitt, Pratt Institute, Brooklyn, assisted by specialists in various fields.

Each course will be given one night each week, from 7 to 10 p.m. for eight weeks although there will be no classes from Dec. 23 to Jan. 3. The series began Tuesday, Nov. 25.

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THE Ottawa Silica Company's three mills operate continuously the year round, making it possible to supply foundries with material promptly. Production includes a complete line of foundry sands suitable for molds, cores, furnace bottoms, sandblasting, for use generally in the steel, grey iron and non-ferrous fields—also Ground Silica (Silica Flour). The Ottawa Silica Company's engineering staff is always available for consultation and service on problems relative to the use of Ottawa Sands.

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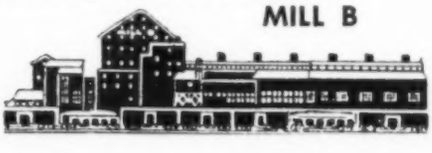
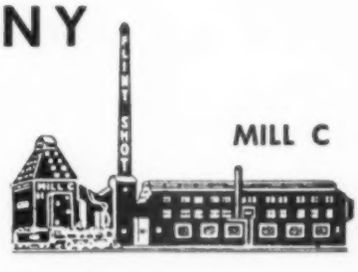
MILL B



MILL C



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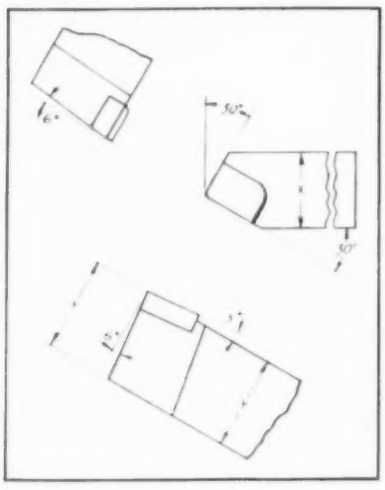
NEW EQUIPMENT and Supplies

Cutting Tools

McKenna Metals Co., Latrobe, Pa., has developed a new standard series of tools in large turning and facing styles for heavy machining. As



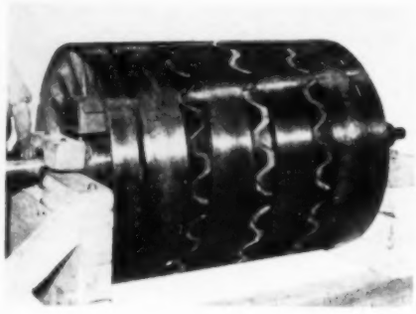
shown in the accompanying illustration the position of the tip in the shank permits a greater thickness of steel under the cutting point of the tip, permits the top surface or chip breaker to be ground without the necessity of grinding away steel. During the life of the tool the height of the cutting point is retained rather than lowered each time the tool is ground. Tools of this design are available in all turning and facing styles and in all sizes 1 inch or larger.

Shaft Coupling

Falk Corp., Milwaukee, has added a new coupling to its line of couplings for floating shaft requirements. The new coupling is said to be especially adaptable for use on horizontal and vertical pumps, exhaust draft fans, etc. The coupling is constructed entirely of steel; two hubs, one carrying an internal flange to which the cover is secured; a special tempered steel member forming a complete cylindrical grid member; and flanged steel cover secured to the hub flange with cap screws. The coupling is made in three types. 1—Single piloted will support a long shaft extension without an inboard bearing. 2—Double piloted horizontal. 3—Double piloted vertical is designed for vertical drive requirements where considerable distance exists between the driving and driven equipment.

Magnetic Pulley

Dings Magnetic Separator Co., Milwaukee, recently made the magnetic pulley shown in the accompanying illustration which is claimed to be the largest commercial magnet ever built. The pulley



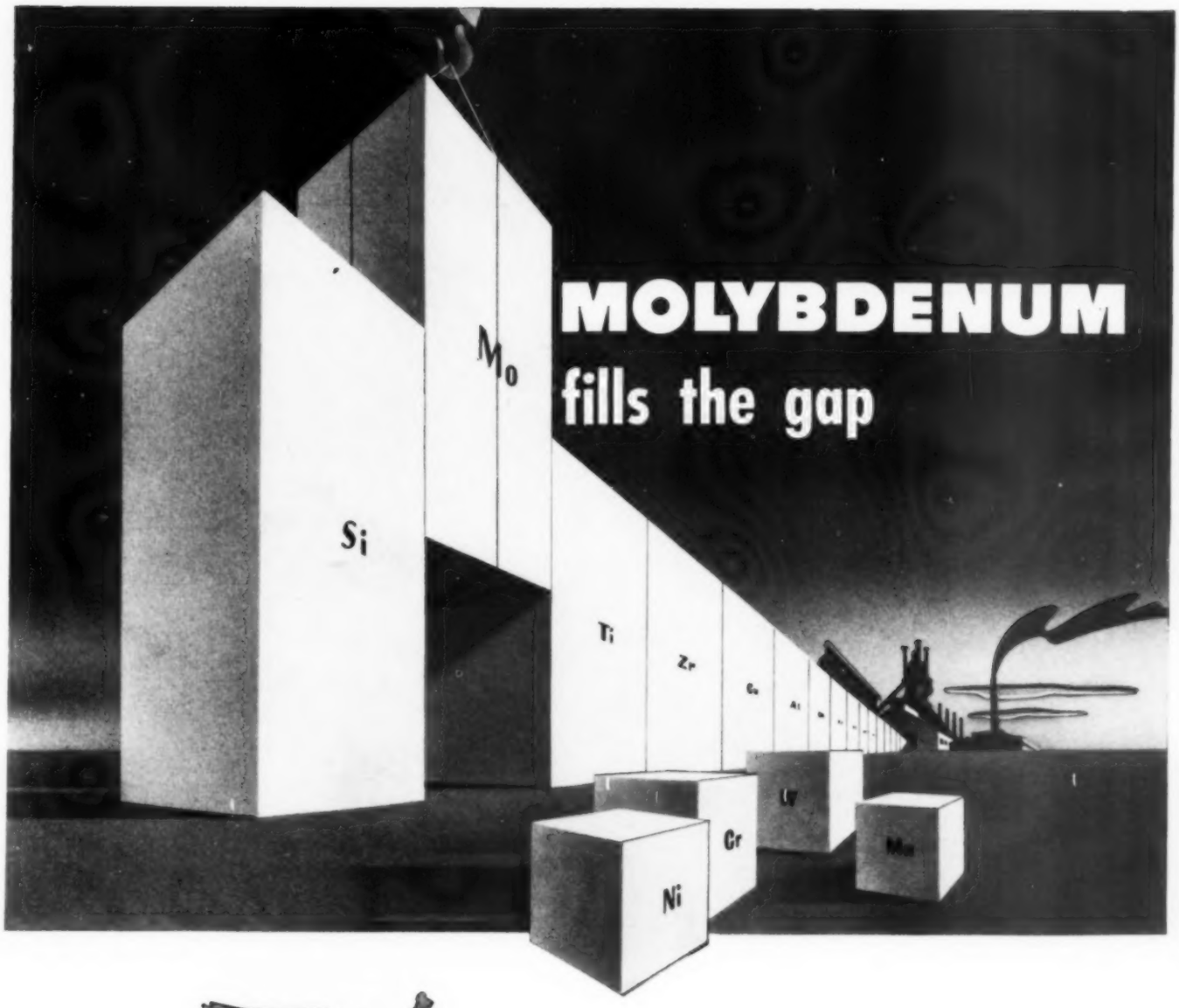
is 48 inches in diameter with a 63-inch face. The pulley is the high intensity type and serrated, air-cooled design which incorporates radial and longitudinal ducts to provide maximum air circulation through the coil area. The separator weighs 18,000 pounds and includes 5900 pounds of copper magnet wire. In energizing the coils 7.8 kilowatts are consumed. Coil covers and end rings are made of bronze to prevent short-circuiting the magnetic lines of force.

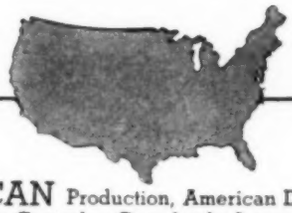
Fan Blade

Chelsea Fan & Blower Co., Irvington, N. J., has placed on the market a newly designed fan blade which it is claimed operates quietly when moving an increased volume of air. The unit is precision balanced to insure perfect alignment. The polished steel, die stamped and die formed blades are riveted with five rivets for extra stability to the bolted arms. A polished stream lined hub is mounted over the fastening base. The unit is available in sizes from 19 to 72 inches.

Compressor

Schramm Inc., West Chester, Pa., has designed a new model compressor, a small compact unit claimed to incorporate all the fine workmanship and materials in the larger sizes. The new model shown in the accompanying illustration is equipped with mechanical intake valve, long life discharge valves and multi-cylinder construction. The four *v*-type cylinders do not require a cooling unit or running water. The general arrangement results in an extremely compact and serviceable unit. The compressor is available in many different mountings and may be operated either by *v*-belt or direct motor. An air receiver base or over head tank is suitable for pressures up to 200 pounds. The unit may be operated at full or reduced speeds for minimum or maximum loads. It is claimed to be an ideal device for drilling, spraying, riveting, chiseling, chipping, stone carving, sand blasting, inflating tires, or in any situation where compressed air is needed. It may be bolted to any level foundation. It is light and compact, has no vibration and therefore does not require a platform, support or foundation.





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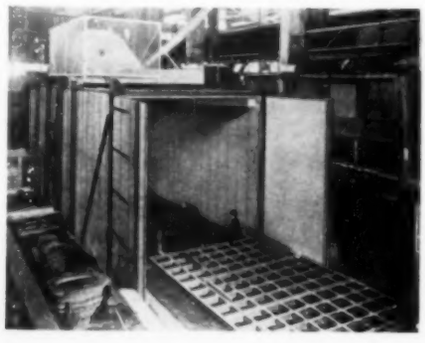
Reversing Motor

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a new capacitor-start reversing motor for use on cranes, hoists, lathes and many other applications. The motor is available in ratings from 1/16 to ¾ horsepower, single phase 60 cycle and operates at 1725 revolutions per minute on 115 and 230 volt circuits. To reduce maintenance, no brushes or commutators are used. Reversing the motor requires a special centrifugal starting switch with two contacts, a solenoid relay and a resistor, furnished as part of the motor. A drum switch is provided separately to operate the motor. In operating, the drum switch is closed to set up a power circuit through the solenoid relay and the motor windings. The relay transfers the circuit from the lower to the upper contact and locks the relay across the line. Line voltage across the motor main and starting windings starts the motor. The centrifugal starting switch opens at a predetermined speed to disconnect the starting windings and the motor operates on the main winding as an ordinary single phase induction motor. To reverse the motor the drum switch is thrown to the other side.

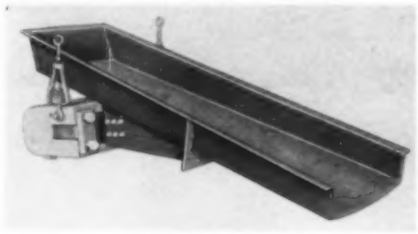
Mold Drying Oven

Gehnrich Corp., Long Island City, N. Y., recently installed the oven shown in the accompanying illustration, designed to handle from 40 to 50 tons of molds and 100 tons of flasks and cars per load. The oven 16 feet wide, 17 feet high and 40 feet in length has dual panels with metal walls, and with roof and doors packed with reinforced mineral wool blanket insulation. No through metal is claimed to result in a minimum heat conduction and fuel waste. The doors swing from heavy ball bearing strap hinges and the rack and pinion door locking mechanism and locking bars assure tight closure. Heat for the oven is supplied by a direct gas fired chamber outside the oven but built integrally with it. Heated air is drawn through a large fan and discharged into the oven by specially arranged ducts. The heated air passes through the work load at uniform velocity and temperature and vents into the heater chamber where it is mixed with fresh air, reheated and recirculated back into the oven. The oven is provided with automatic temperature control. Gas burners are interlocked with the air and gas supply lines and controlled in a manner that assures automatic shut down in the event of power failure or any other factor. Under the spur of increased production maximum loads of 57 tons of molds and 150 tons of flasks and cars have been handled satisfactorily.



Vibratory Feeder

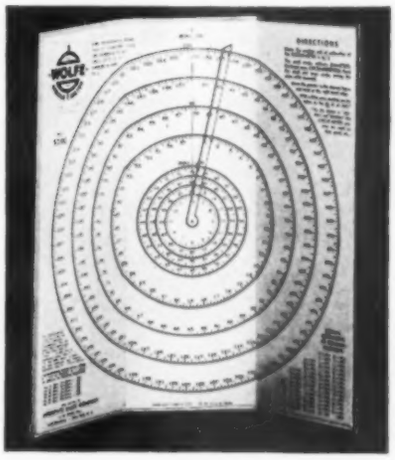
The Syntron Co., Homer City, Pa., recently has added two new models of electromagnetic vibratory feeder conveyors to an extensive line. The model shown in the accompanying illustration has a capacity up to 100 tons per hour and carries feeder pans up to 36 inches in width and up to 60 inches in length. A larger



capacity unit it is claimed will handle up to 500 tons per hour and can be supplied with troughs up to 48 inches in width and from 60 to 96 inches in length. All sizes are vibrated at high speed by a pulsating electromagnet. Exclusive patented principle is through a rectifier tube. The finger tip rheostat control of the rate of flow permits a range of flow from maximum down to a slow dribble.

Circle Meter

Interstate Sales Co., New York, has developed a circle meter, shown in the accompanying illustration, which gives instantaneous reading of diameters and circumferences of any circle up to 72 inches diameter, in steps of ⅛-inch or less. Readings on the meter are in fractions, but for convenience a table of decimal equivalents of common fractions is included. The meter is printed in four colors to distinguish each set of circles. The small circles indicate diameters; the larger circles indicate circumferences. The pointer is moved to the desired figure and the reading is taken at the right hand edge. Readings are taken on the small and large circles having the



same color numerals. The circle meter is 4½ x 12 inches when folded and fits easily into pocket or tool box. It is available flat for shop use. It is strongly made and with ordinary care should last indefinitely.

Wash Fountain

Standard Wash Room Equipment Co., Saginaw, Mich., is marketing a new line of industrial group wash fountains available in either 36 or 54 inches diameter. The fountains are precast stone and are heavily reinforced. Water is introduced through 10 small individual spray heads, equally spaced on the inside edge of the bowl. It is claimed that this design prevents water from splashing over the rim. It is also claimed that with this arrangement it is not necessary to bend over the bowl to wash. Ten workers can wash at the same time. In one model with leg control a metal pad projects through the rim of the fountain directly under the spray head which it operates. Leg pressure on this pad turns on the water. When pressure is released the water is shut off. In the individual control models the water is turned off or on by a half turn of the spray head. In the single control models a single valve operates all spray heads.

Swing Grinder

Jefferson Machine Tool Co., Cincinnati, just has introduced an improved swing frame grinding and polishing machine shown in the accompanying illustration. Improvements include heavy metal guards at the v-belts constructed to permit sufficient flexibility for universal movements, and hinged wheel guard of heavy sheet metal. The grinder is powered by a 3-horsepower alternating current motor and will take grinding wheels up to 14 inches in diameter with a 2¾-inch face. In addition to grinding the machine may be used for polishing large surfaces which cannot be handled on the standard floor lathes.

Safety Spectacle

Tulca division, Univis Lens Co., Dayton, O., recently has added a new, rimless type, safety spectacle to its eye protection line. The spectacle is fitted with the firm's special safety lens which are not made of glass. The spectacle is designed specifically for use by supervisors, checkers, inspectors, maintenance men, etc., who are exposed to eye hazards in plants but are not actively engaged in operations where goggles are mandatory. It is claimed that the spectacle is comfortable, pleasing in appearance, and light in weight.

Control Switch

Photoswitch Inc., Cambridge, Mass., is making a level control device which automatically controls on and off valve or pump control of any liquid. Equipment is available for single level indications and control; on and off pump-up and pump-down control at two levels; boiler feed water control and low level safe guards. Probe fittings have been designed for high and low pressure, for temperature requirements and for sanitary installations. Probes or electrodes are attached to the tank at levels representing the low point where pumping starts and at the high level where pumping stops. These probes are wired to the level control. When the liquid level falls below the lower probe the lever control starts the pump. When the level rises to the upper probe, the fluid acts as a conductor of the small amount of current required for the operation of the lever control which stops the pump. Even with nonconductive fluids the probe circuit carries only milliamperes of current and low voltage. The controls do not involve mechanical floats or pressure switches. It is claimed they are easily installed and maintenance is free.

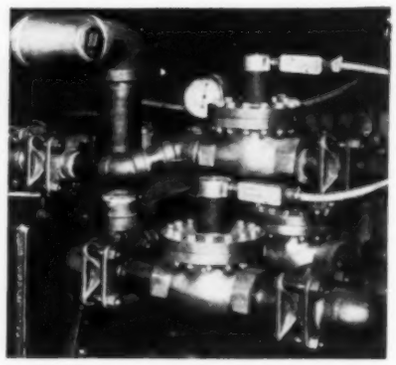
Tool Grinder

Hammond Machinery Builders, Inc., 1605 Douglas ave., Kalamazoo, Mich., has developed a new 10 inch carbide tool grinder, combining facilities for straight wheel peripheral and cup wheel grinding. Work tables tilt from level to 25 degrees as indicated by a scale. Both tables

slide easily to any point of adjustment on machined ways and are locked with a turn of a handle. Tables are slotted to accommodate the protractor angle guide and are grooved to keep the working surface free from grit and dirt. The table on the right of the accompanying illustration is mounted on a heavy shaft, directly over a casting which serves as a sludge pan. By releasing a simple clamp the entire unit may be removed from the shaft for cleaning the sludge pan or replacing the wheel. On standard models the spindle turns at 2100 revolutions per minute. Spindle is driven by adjustable V-belts from a 1 horsepower motor, and may be right or left hand running at a speed of 1750 revolutions per minute. The base is a heavy, vibrationless casting with opening in the back for access to the motor. Overall height from floor to center of spindle is 38 inches; size at base 15 x 18 inches.

Pressure Valves

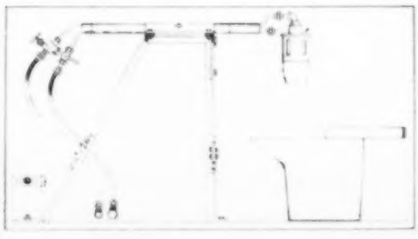
E. C. Atkins & Co., Indianapolis, Ind., is manufacturing a line of valves for operating pressures up to 3000 pounds and to supplement the



standard line of valves for operating pressures up to 300 pounds. The new valves are available in the following sizes: ½, ¾ and 1½-inch and can be supplied for standard currents. Under certain conditions on liquids a certain amount of timing control may be obtained on opening and closing speeds. The accompanying illustration shows a valve for operating a 250-ton press at 1000-pounds oil pressure with full remote control. At full load the pressure immediately goes to original accumulator pressure with no time lag. Valves are bronze, packless, renewable seats and disks, exceptionally rugged, screwed ends. Seat diameters can be supplied up to full pipe size. Bubble tight pilot assembly can be furnished for air and gas operation.

Ladle Heater

Hauck Manufacturing Co., Brooklyn, N. Y., is supplying an oil burner for heating covered pouring ladles. It is claimed that the burner shown in the accompanying illustration operates satisfactorily with compressed air at 40 pounds pressure or more, and oil at 10 pounds pressure or more. The device burns all grades of fuel oil which flow without preheating. Volume of the flame is controlled by an air and oil regulating valve; requires no preheating, lights instantly upon opening of the valve. Four different sizes are available for different capacity ladles.



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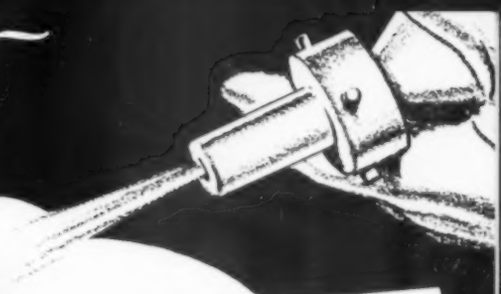

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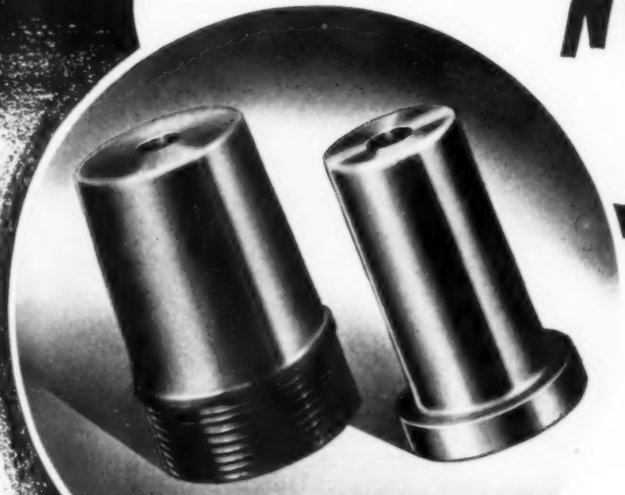

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THE FIRST BIG ADVANCEMENT IN YEARS!

AMERICAN SCORES AGAIN!—with another product designed to save time and money in metal cleaning—this time it's a New Long-Lyfe Nozzle that sells at a price you can afford to pay.

Think of it! Only $8.00 for a 3/8" high quality nozzle—$10.00 for the 5/8" size! At that price your "per nozzle hour" costs are bound to go 'way down. And what is more, you will save on compressed air and be able to do a better cleaning job in less time!

The long life and low cost of this nozzle are made possible by an amazing new non-metallic insert consisting of an extremely hard, abrasion-resisting ceramic—the product of years of research in the field of colloidal chemistry. The jacket enclosing the insert is a big improvement, too—it is made of the same patented abrasion-resisting alloy steel used in the blades of the famous American airless WHEELABRATOR.

We can supply the new nozzle in the screw type and in the flange type. (See illustration.) It is made in standard sizes ranging from 3/16" up to and including 5/8". Adapters are available for fitting these nozzles to your present equipment.

Compare the Price—Compare the Value—Start making important savings by specifying this nozzle the next time you replenish your stock. You can't afford to use less—you needn't pay more. If you wish further information write for Bulletin No. 17.

FEATURES

- Low first cost—long life.
- Costs less to operate.
- Cuts air cost because of slow wear.
- Adaptable to present equipment.
- Maintains even contour of blast stream for long period of time, thus giving greater uniformity to finished work and faster cleaning.
- Extreme hardness and density.
- Good mechanical strength.
- Does not "bell out" rapidly.
- High finish bore; no soft spots to start uneven wear.
- Non-metallic, reducing static to a minimum.

AMERICAN FOUNDRY EQUIPMENT CO
505 S. BYRKIT STREET MISHAWAKA, INDIAN

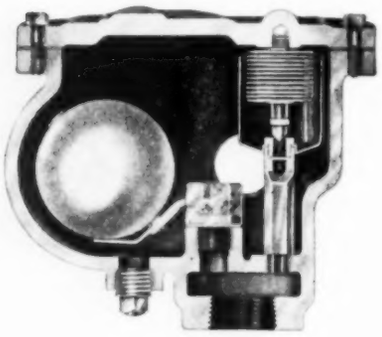
Tool Attachment

Stow Mfg. Co. Inc., Binghamton, N. Y., recently has placed on the market a new tool post attachment for lathes driven by a portable flex-

ible shaft made by the same company. It is claimed that a lathe equipped with this device may be adapted to many different grinding operations, external and internal. The device accommodates grinding wheels in size up to 6 inches diameter, 1 inch face. By taking off the clamp spindle and substituting a collet chuck, a variety of mounted wheels and points may be operated for internal grinding and recess surfacing. On the tool end the tool post attachment is fitted with a combination radial thrust and annular ball bearing. A floating self aligning ball bearing is used on the shaft end. It is stated that this rigid spindle support insures true running of the unit at speeds as high as 6800 revolutions per minute.

Float Traps

The Trane Co., La Crosse, Wis., has designed a float trap for service on high and low pressure steam systems to remove all air and condensation readily from unit heaters, blast heaters, steam mains or any steam condensing unit regardless of condensation temperatures. For low pressure work smaller models of the trap have brass seats and plungers. Heavy duty traps have alloy steel seats and plungers. Small discharge ports and other modifications meet



the requirements of high pressure work. All parts subject to wear are silicon-chromium or stainless steel. Bellows members are nickel plated. A unique bellows shield triples the sensitivity of the traps and prevents water hammer. A handy clean out plug is at the bottom and the seat is high in the trap, well above the dirt line. A variable ratio lever float mechanism insures extra operating power and extra capacity. Steam cannot blow through because the trap is designed to keep the outlet under water. All parts readily may be removed without disturbing the pipe connections.

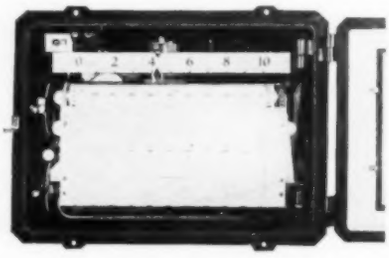
Cylinder Cart

Carlinghouse Brothers, 2416 East 16th street, Los Angeles, is making a new acetylene and oxygen tank cart shown in the accompanying illustration and claimed to be unusual in three major respects: 1—Has a total width of 24 inches; 2—Carries two tanks, one behind the

other; 3—Chassis is mounted on two large pneumatic tired wheels with fully depressed hubs. The 3½ x 30 inch tires facilitate movement over rough, uneven ground or littered floors. Either tank may be removed independently of the other. The acetylene tank is inserted at the front while the oxygen tank is placed in the rear. The cart, rigidly constructed of welded steel tubing is in perfect balance at any angle. A broad, heavy bottom plate rests flush on the floor to assure steady support when the tank is standing. A large tool box and two rod holders for long and short rods are attached conveniently to each cart.

Controller

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., has developed a new proportional controller for applications in which throttling control with or without automatic reset is required. When the temperature is far below the control point, as in starting, the valve will be wide open. As the temperature rises and enters the throttling zone the valve closes a relay. This prevents over-shooting as the temperature approaches a balance



between heat input and heat loss. The throttling zone readily can be adjusted within wide limits. Other types with adjustment for manual reset, or automatic reset are available.

Smoke Indicator

Rehtron Corp., Chicago, is marketing two electric smoke indication and elimination control robots for operation on 115 volt alternating or direct current. It is claimed the units are easily installed and adjusted and are applicable to any size and type boiler; stoker or hand fired coal burning, or oil fired. The smaller unit, an illuminated density meter continuously indicates smoke density and rings a bell or flashes a light when the smoke exceeds the allowable maximum. The second or larger unit has all the features of the smaller unit and in addition is equipped with full automatic control for magnetic solenoid valve or blower motor supplying steam or air to over fire jets. Adjustable time delay on the load circuit insures correct amount of steam or air to mix with unburned gases and supply oxygen deficiency. The installation may permit using a cheaper grade of fuel without loss of boiler efficiency and is a guarantee against violation of smoke ordinance. It is claimed that installations on large and small boilers have shown a fuel saving as high as 20 per cent.

Surface Plate

South Bend Tool & Die Co., South Bend, Ind., is supplying surface plates 48 x 96 inches cast in semi-steel and plane finished within an accuracy of 0.005-inch. These plates originally were developed and made by the company for its own use. The surface plate offers seven specific support points for utmost flex-

(*Concluded on page* 130)

An Invitation to Attend

THE FIRST WESTERN HEMISPHERE FOUNDRY CONGRESS

and The 46th Annual A. F. A. Convention and Exhibit

Cleveland

April 18 to 24, 1942

• An invitation to participate in what gives every promise to be the greatest gathering of foundrymen and foundry machines and accessories ever to be assembled under one roof!

In addition there will be a great educational exhibit by the U. S. Army Ordnance Association with special emphasis on the castings which play so important a part in the tremendous war production program in our country.

Outstanding technical sessions featuring present day casting production methods will draw large crowds as everyone is vitally interested in peak efficiency in his own foundry.

THE FOUNDRY—

For April

THE PRE-CONVENTION ISSUE

. . . pre-viewing this great convention—new and improved equipment to be displayed—new processes in material handling—new methods in foundry practice to be discussed—a complete program of the entire six days . . . technical sessions . . . plant visitation . . . social and entertainment plans . . . places to see . . . things to do . . . all this *in addition* to the many worthwhile editorial features and valuable and pertinent information of interest to *all* foundrymen found in every issue of The Foundry.

Advertising forms close March 6

For May

THE POST-CONVENTION ISSUE

. . . a printed record of what actually took place at the convention . . . reports of technical sessions . . . the exhibition . . . who was there . . . what they said and did . . . in fact the May Post-Convention issue of The Foundry could well be indexed as a reference volume and made a valuable addition to your foundry library.

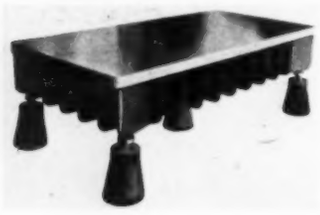
For those thousands of foundrymen who can attend the convention, the May issue of The Foundry will serve as a diary of the profitable and pleasant contacts with fellow foundrymen during the days in Cleveland. For those who cannot attend, this important issue of The Foundry *will be the convention itself!* For *all* it will preserve this Convention in word and picture.

Advertising forms close April 6

RESERVE ADVERTISING SPACE IN THESE TWO ISSUES NOW!

(*Continued from page* 128)

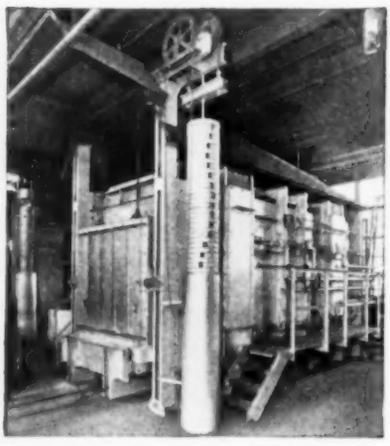
ibility. Two sizes of adjustable blocks or legs, 10 x 12 inches, provide possible working surface



heights between 29 and 33 inches. The blocks support threaded 1½-inch screws, each topped with a circular cap recessed to contain any of the projecting support points on the bottom of the plate. A 12-pitch thread provides fine adjustment to compensate for floor irregularities, etc. Five blocks are supplied with each plate. The ribbed under side of the plate is designed to provide maximum strength without excessive weight. The plate weighs 3 tons.

Heat Treating

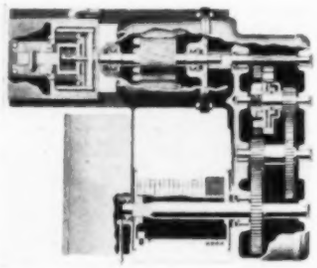
R. S. Products Corp., Philadelphia, has designed a new heat treating furnace featuring an individual electric motor drive. The accompanying illustration shows one of a battery of four 5-ton furnaces used in hardening, normalizing, annealing, stress relieving and tempering processes. Furnaces are the car hearth type, propane fired. A special feature is an automatic damper for atmospheric control. Larger furnaces of the car hearth type stand-



ard and special design have a capacity up to 100 tons per charge to meet the entire range of industrial heat processing requirements with economy and high productivity. The furnaces are available for oil, gas or electric firing.

Small Hoist

Robbins & Myers Inc., Springfield, O., has developed a new type steel hoist to provide efficient, low cost material handling for all types of industry. The new hoist shown in the accompanying illustration is built in 100 and 2000 pound capacities. It is claimed to be an unusually compact unit, designed to occupy a minimum of head room space with maximum lifting power. All gears and shafting are alloy steel. Both sizes are powered by high torque motor hoists. Control is by push button pendant with single or two speeds for polyphase alternating current. Provision also is made for 110-220 single phase current. The load brake incorporated in the hoisting gears automatically controls speed when the load is low-



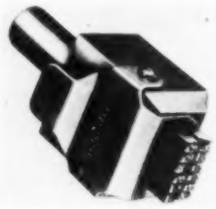
ered. If power fails, it prevents the load from dropping. Brake is over size, designed to operate for years without adjustment or wear.

Boring Tools

McKenna Metals Co., Latrobe, Pa., has designed recently a new series of boring tools with round shanks as shown. The new tools have the same tool angles as other standard boring tools made by the firm. One of the new tools is for 30 degree boring bars. Another is for 45 degree boring bars. Tools are tipped with one grade of metal for machining steel, or with another grade, very hard for precision boring and finishing cuts.

Stamp Holder

The Acromark Corp., 251-257 North Broad street, Elizabeth, N. J., has developed a new two line stamp holder as shown in the accompanying illustration, in which the top line may carry numbers, letters or symbols and the bottom line may carry the number. Both lines are quickly interchangeable by simple thumb pressure on the holding clip. The holder is ruggedly built of shock resisting heat treated steel. The shank may be of suitable size to fit any punch press. It is claimed one holder with assorted type takes the place of individual steel stamps in saving time. The



holder is available also in single line and curved line styles.

Respirator

H. S. Cover, South Bend, Ind., has made a new development in respirators in which all aluminum parts have been replaced with plastics. Twin filter plates are held in place by dust tight anchor plates to provide 24 square inches of clear breathing area. Speedy removal or replacement can be made without dismantling the unit. Respirator is patented and carries United States bureau of mines approval against pneumoconiosis and silicosis producing dusts. All valves, grommets, screw connections, etc., formerly aluminum now are molded plastics. New clip-on device replaces former construction and handy slide fasteners adjust the band to any head size. A miniature nuisance dust respirator also has been reduced in weight to less than 1 ounce. This respirator designed to fit over the nose is held in place by elastic ear bands. Nose piece is soft rubber with 9 square inches filter pad.

Drum Handler

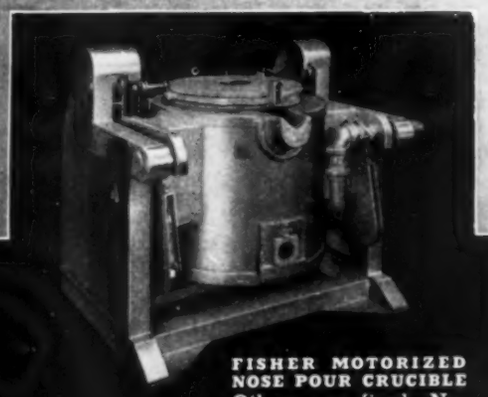
The Lewis-Shepard Sales Corp., Watertown, Mass., has designed a new, quick locking harness for handling barrels and drums. The barrel or drum is placed directly in the harness by a standard type bar-

rel hoop truck. It is no longer necessary to affix and adjust the harness while the barrel is on the floor. The harness is equipped with spring toggle and can be furnished for any size drum.

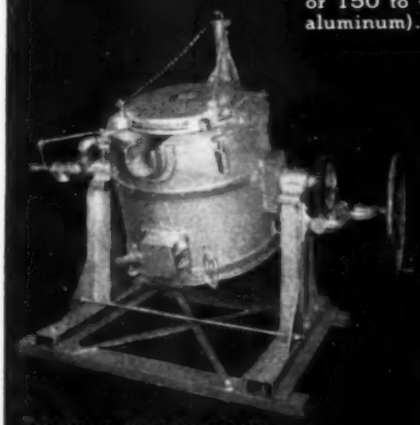
— the experience accumulated by Fisher Engineers thru 35 years of furnace designing and building, and melting room layout engineering—in every branch of non-ferrous metal melting—will sum up as an invaluable combination in both modernization and expansion programs. It paves the way to greater operating flexibility and greater profit, thru coordination of equipment to plant and production conditions. Learn about this engineering service, without obligation, and receive illustrated, descriptive engineering data on the complete line of Fisher Crucible Melting Furnaces (stationary—hand wheel operated, tilting types, and motorized units), Iron Pot Melting Furnaces, Centrifugal Blowers, Combination Blowers and Oil Pump Systems, Karmix Cement, Silicon Carbide Linings, etc.

LITERATURE on any of these units sent on request.

FISHER FURNACE COMPANY
1742 N. KOLMAR AVE., CHICAGO, ILLINOIS



FISHER MOTORIZED NOSE POUR CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).



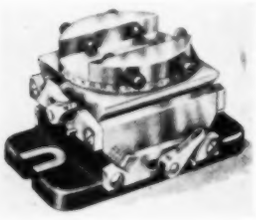
FISHER B.B.I. HAND OPERATED CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).

FISHER TYPE "S" STATIONARY CRUCIBLE MELTING FURNACE
Oil or gas fired. No. 20 to No. 250 crucible capacity. (60 to 750 lbs. in red brass or 20 to 250 lbs. in aluminum).

FISHER COMBINATION BLOWER AND OIL PUMP UNIT
Oil and air requirements delivered by same motor. Full range in combination sizes.

Tool Vise

Hammond Machinery Builders, Inc., Kalamazoo, Mich., has designed an angle tool vise designed for grinding chip breaker grooves into the tips of carbide tools. Complete in itself the vise is mounted on a



lug base easily attached to a machine table. The new tool vise is constructed on a double cradle principle permitting adjustment of grinding angles on three planes. Two closely machined steel blocks, rounded on the bottom, are cradled into each other at right angles. After adjustment they are locked solidly together by tightening cam locks operating in machined segments at the ends of the blocks. A flat circular piece which swivels 90 degrees from center of any of the four sides of the block immediately below is mounted on top. This piece carries the vise jaws. Readings on each block are clearly marked.

Safety Goggle

American Optical Co., Southbridge, Mass., is marketing seven different styles of safety goggles fitted with super armor plate lenses which can be ground to prescription. In this manner eye correction and eye protection is provided for workers with defective vision. According to the announcement these special goggles include spectacle and side shield types for different kinds of eye hazards. The extra strong hardened super armor plate lenses can be obtained in either clear white or Calobar and Crookes glare protection glass.

Motor Control

General Electric Co., Schenectady, N. Y., has made available a new electronic control system to provide simple, stepless control of direct current motors from alternating current lines where a wide speed range is needed. The unit consists of a small control station, a transformer and a tube panel, to cover motor sizes up to 5 horsepower, 230 volts. A single dial control mounted in a heavy duty push button station covers the complete speed range, above and below basic speed. Equipment can be provided for reversing service, also may be furnished with dynamic braking. A thermal overload relay protects the motor on sustained over loads. Fuses provide direct current short circuit protection. The control station may be mounted accessible to the operator. The tube panel can be furnished in various types and for corrosive and dusty atmospheres.

Electric Cranes

Northern Engineering Works, Detroit, is producing a line of electric hoist cranes for auxiliary use in large plants and for main hoisting in smaller plants. It is claimed these cranes are economical in first cost and in operation, easy to handle, built in various capacities up to units large enough to handle 15 ton loads. Types available include top running or under hung, hand or motor traveled bridges and hoists, transfer types and special

double hook types. Cab control is furnished where desired. Auxiliary types include jib cranes and self supporting pillar cranes. All cranes carry a modern low head room hoist built with machine tool precision. The hoist, it is stated is outstanding in design and construction, gives maximum hook lift, insures continuous operation and provides positive control and safe handling.

Air Clamp

Mead Specialties Co., Chicago, is marketing a new hold down clamp for drill press work. The clamp may be used on any cylindrical column drill press. A divided collar clamps quickly in any desired position. The working head is mounted on a heavy horizontal arm which slides in a split boss on the column collar. Two hand levers hold the head so that pressure may be applied in any direction and at any point on the work within the capacity of the press. The clamp is operated by a two-way valve on the upper left side of the working head. For certain types of operation a foot control is available. Quick detachable feet of various designs can be used, or the ram alone may be used on large units. When the pressure is released the arm automatically returns to the top position.

Electrodes

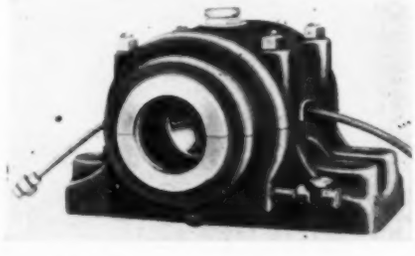
Harnischfeger Corp., Milwaukee, has developed two new types of welding electrodes claimed to be suited ideally for building up and reinforcing 11 to 14 per cent manganese steel, or carbon steels where high resistance to impact and abrasion is desired. One is a coated manganese-molybdenum electrode on which the thin coating acts as an arc stabilizer and affords protection against loss of manganese and molybdenum. The other is a bare manganese-molybdenum electrode providing an austenitic deposit.

Lubricator

The Roto Co., 145 Sussex ave., Newark, N. J., has made available a new type sight feed lubricator for air driven equipment which operates successfully regardless of position in the line. The new lubricator requires only a single regulating valve instead of the three used on previous types. The device can be installed in an ordinary tee in the air line. Sizes range from a pint to a quart and can be regulated to drop as low as 5 drops per minute.

Pillow Blocks

Dodge Mfg. Corp., Mishawaka, Ind., has developed a new line of precision pillow blocks in plain and water cooled types and in shaft sizes from 1 7/16 to 8 inches designed for a wide range of industrial applications. Ample lubrication is provided by *T*-type section brass oiling rings for sizes up to 3 7/16-inch and two rings in the larger sizes. A brass oil gage can be placed on either side of the bearing and with an additional ½-inch pipe may be extended to any distance from the bearing. Bases have drain holes in each end and caps with inspection hole and cover. Bearings are self aligning in either expansion or non-expansion types. The new pillow blocks are identical with the plain type except for the water cooling feature. Sizes up to 3 15/16-inches are water cooled only in the lower liner, with one flexible inlet and one outlet connection. Sizes 4 7/16-inch and larger are water cooled in upper and lower liners and have two flexible inlet and two outlet connections.



12 hours

"JISCO" SILVERY PIG IRON . . .

JISCO FURNACE AND SKIP HOIST

. . . OLD HICKORY . . .

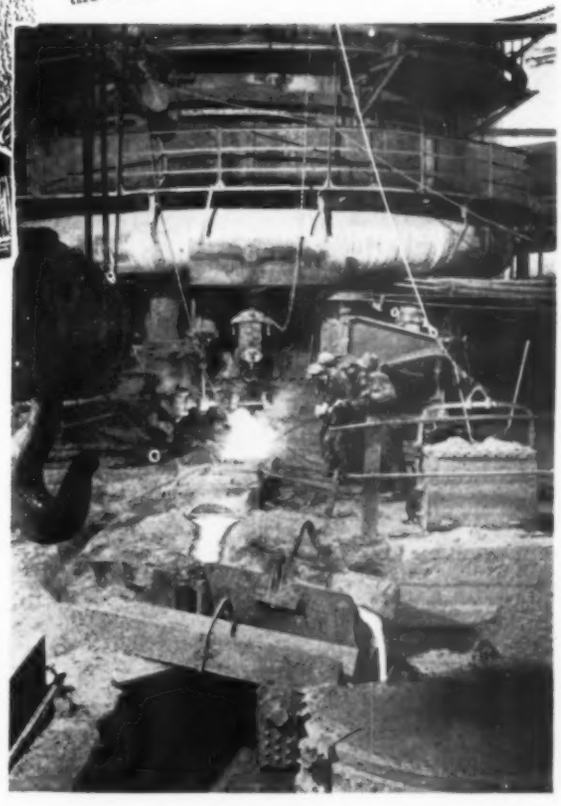
JACKSON DEFENDING DEMOCRACY

'Old Hickory' was always found where the fight was hottest. His leadership was a big factor in young America's struggle for freedom. To-day, JISCO Silvery is a big factor in the race to arm for defense.

from skip hoist to ladle . . .

Old charcoal furnaces were built by hillsides in order to facilitate charging. Modern furnaces are filled by skip hoists like the one at JISCO Furnace, pictured above. Efficient charging, larger size, and stronger blast have all contributed to quicker and more complete smelting of iron ores.

In producing silvery iron it requires about 12 hours from the time the ore enters the furnace, until the molten iron is tapped from the hearth. The higher the silicon content of the iron the longer soaking time required in the furnace. JISCO Silvery is mechanically charged, thoroughly smelted, machine cast, and accurately analyzed.



TAPPING FURNACE

THE JACKSON IRON & STEEL Company
JACKSON, OHIO.

CAST BOMB SHELLS IN CANADIAN PLANT

(*Continued from page* 66)

per cent, permeability 18, green compression 10.4 pounds, dry compression 280 pounds, deformation 38, flowability 77, green shear 3.55 pounds, dry shear 73.5 pounds.

Four castings are made in each mold, with one half of each casting in the cope and the other half in the drag. Bars in cope and drag are arranged to leave a circular opening over each pattern. In the drag the ring bar fits closely on the bottom or main core print of the pattern and later serves as a firm and accurate seat for the core. In the cope the ring bars serve as openings for the simple risers or feeding heads. Since these heads form an enlarged continuation of the pointed end of the casting, it is apparent that some method must be adopted to hold the small top print of the main core positively and accurately in the center.

A short piece of thin angle steel as roughly shown in a small accompanying sketch, and provided with two holes accurately spaced, is placed over each pair of patterns. This piece of steel remains in the mold and spans the riser opening. The holes serve as prints for maintaining the core in a central position, and the pieces of steel also serve as chaplets to prevent the cores from rising when the mold is filled with molten steel. The steel strips remain in the feeding heads and the combination is returned to the furnace when the heads are removed from the castings. Incidentally, the heads are cut off on a specially constructed high power circular saw.

The set gate pattern with a single branch leading to each of the four mold cavities and a projection in the center to serve as a well is placed in position on the pattern plate before the drag flask is filled with sand. A shovelful of special facing sand D is dumped around the gates and a small area of the shell patterns in the immediate vicinity. Metal in the well absorbs the shock of the falling metal and the highly refractory sand withstands the erosion incident to the swiftly flowing stream in this vicinity.

Sprue Formed in Tiles

In a further precautionary measure to insure the entrance of clean metal, the sprue is formed in a number of tiles erected on end around a sprue pin in the same manner that sleeves are mounted on a ladle stopper rod. From the foregoing it is apparent that any hazard incident to the human element is practically eliminated. Sand is prepared according to a standard formula, patterns are highly finished, rigidly and accurately mounted, patterns are provided for forming the gates and riser.

The operator pulls a handle to open a gate in an overhead chute and sand falls into the flask until it is filled. An automatic device on the molding machine regulates the number of jolts. The finished half mold from each machine is lifted, rolled through an arc of 180 degrees and deposited on a self leveling table which descends by gravity and thus releases the patterns. The powerful reversing and lifting arms on the machine return the patterns to the jolting table. The molds are lifted from the floor and placed side by side on a slow moving conveyor which carries them through a continuous type horizontal oven on a 3½-hour cycle, 2½ hours at a temperature of 800 degrees Fahr., and 1 hour in a cooling zone.

Before the molds enter the oven they are sprayed with a mold wash and then brushed to insure a smooth skin on the casting. A batch of mold wash contains 300 pounds silica flour, 1 gallon bentonite, 5½ quarts core oil, a proprietary steel core and mold wash 25 per cent or 7 gallons. In preparing this mixture the water, oil and proprietary material are mixed first. Then the silica flour gradually is stirred in. The mixture is maintained at 50 plus or minus 2 Baume.

Blow Large Cores

Core making equipment and methods probably represent the highest development attained up to the present in this branch of foundry practice. It is claimed that the core 40½ inches in length, 11⅝ inches diameter at the widest section and weighing 175 pounds dried, is the largest ever produced on a core blowing machine. The core is made from sand mixture *B* referred to previously and contains no rods, wires, arbors or venting material.

A 2-inch diameter steel rod laid in the center of the core box forms a vent opening through the core. The rod is pulled out through an opening in the print end of the corebox before the corebox is opened. This large opening in the center of the core provides free exit for the gas, allows for core compression when the casting is contracting and promotes complete combustion of the binding material.

As a result of this combination the sand runs readily from the casting when the operator loosens it with a bar at the open end and hits the casting a few blows with a hammer. All the used sand is discarded. Tolerances on the shape and size of the core are so slight and the specifications are so strict for a smooth finish on the inside of the casting that no variation can be tolerated in the core sand mixture.

The core blowing equipment designed and built by the Osborn Mfg. Co., Cleveland, in co-operation with the general manager of the steel foundry, includes the core

(*Continued on page* 136)

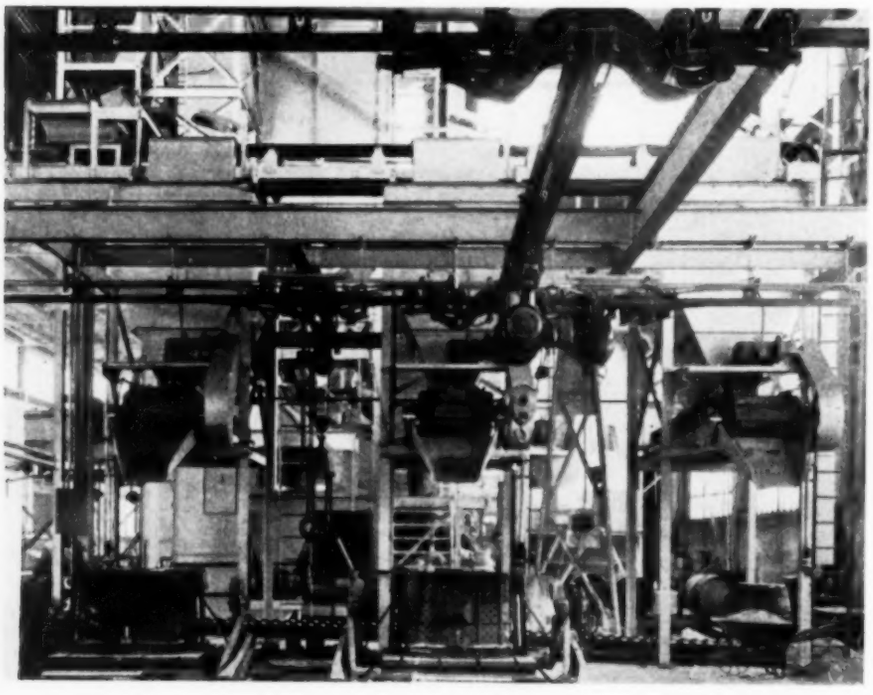


Fig. 24—Sand for cope and drag machines falls from over head chutes

Now Ready!

Revised, Third Edition

"ELEMENTARY FOUNDRY TECHNOLOGY"

★ Revised and brought up-to-date with a completely new chapter on malleable cast iron foundry practice, the Third Edition of "Elementary Foundry Technology" will soon be ready for distribution.

Fundamental data on both foundry practices and those related subjects of importance to foundrymen are thoroughly covered for use of apprentices and young men studying modern foundry operation and management.

This book contains material conforming to the requirements for instruction as set up in the minimum standards of four year foundry apprenticeship in the United States. It is sponsored by the National Founders Association, Chicago.

In addition to the completely new chapter on malleable cast iron foundry practice, the chapter on pig iron is revised to make it conversant with present day practice. Additional references are included.

Well over half of the book is devoted to discussion of fundamentals of foundry practice, with special reference to the field of gray iron and steel manufacture. Foundry subjects covered include . . . Elements of Iron . . . Iron Manufacture . . . The Cupola and Its Operation . . . Elementary Problems in Steel Foundry Production . . . Brass Melting . . . Foundry Sands . . . Gates and Risers . . . Molding Machines . . . Core Machines . . . Long Life Molds . . . Malleable cast iron foundry practice.

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"Elementary Foundry Technology", by L. A. Hartley; Third Edition revised by Edwin Bremer and Pat Dwyer; 377 pages; 6 x 9 inches; 132 illustrations, 16 tables; includes glossary, index and bibliography; sponsored by the National Founders Association Chicago; Price $3.00, postpaid; Published by The Penton Publishing Co., Cleveland.

(*Continued from page* 134)
blowing machine proper, the corebox drawing machine unit and the rollover support stand unit. Coreboxes and core drier equipment were built by the Standard Pattern Works, Detroit.

The machine is equipped with a turntable built into the machine base and arranged to index into two positions of 180 degrees each where they are locked in position by a foot pedal. One position is the blowing position where the corebox is filled with sand under pressure. The other is the horizontal or drawing position in which the corebox is rocked down and the core is removed. The foot pedal releases the turn table and permits it to be rotated by hand into either position.

Operating corebox equipment includes two coreboxes hinged to the turntable of the machine in such a manner that the core is blown while the corebox is in a vertical position. The turntable is rotated 180 degrees and the corebox is swung down by an air hoist to the horizontal position, over the drawing mechanism. The same hoist removes the upper half of the corebox. The drier then is placed in position and clamped to the lower half of the box.

The assembly is rolled over by a trunnion construction on the corebox riding on rollers on the support stand. The quick acting clamps are released and the complete core resting in the drier shell is lowered on to a reception table from which it is removed and placed in the oven. The corebox is reassembled, swung back to the vertical position and rotated to the filling position under the sand magazine. The turntable brings the second filled box into position to be swung down to the horizontal position.

In the vertical, swing shelf, oil fired type of core oven, designed and built by the Foundry Equipment Co., Cleveland, the cycle from entrance to exit is 5¾ hours, 4½ hours at a temperature of 420 degrees Fahr. and 1¼ hours in a cooling zone. The oven is equipped with full automatic control, special oil burners, improved recirculation system and is fully insulated to prevent heat radiation. The dried cores are sprayed, then brushed with a mold wash in which a proprietary material to the extent of 300 pounds per batch is mixed with water and maintained at 60 Baume.

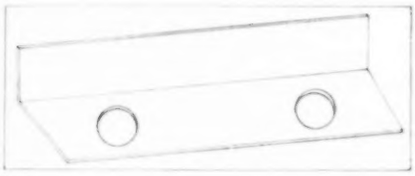
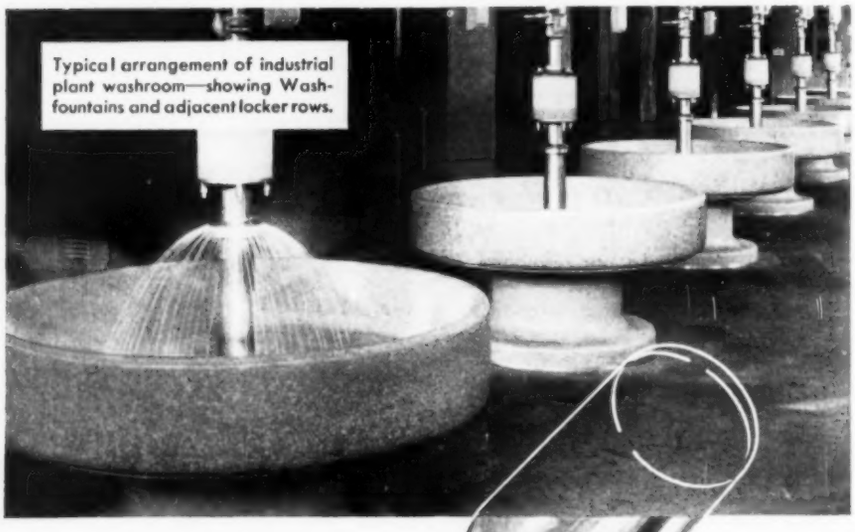


Fig. 25—Small piece of angle steel rammed up with patterns holds core in place in the center

As the dried molds emerge from the drying oven they are lifted off in pairs, cope and drag. The drag is lowered into a concrete wall pit which brings the upper face approximately flush with the floor to facilitate setting the cores which are grouped on end in the immediate vicinity. An ingenious device somewhat similar to the shank employed in some nonferrous foundries is employed for handling the cores. The lifter has two rubber lined jaws in the center which slip readily over the core and then are tightened when the operator at one end brings the handles together.

Two men lift the cores and lower them into the molds where they rest on the bottom prints. A gage is employed to insure proper concentricity with the mold wall. The cope is rolled over and lowered into place on the drag. The two parts are clamped together and the entire mold is lifted and placed on the long roller conveyor ready to be filled with steel. The entire op-



DON'T LET THE WASHROOM BE ANOTHER BOTTLENECK

★ Dermatitis, according to physicians, heads the list of industrial diseases. Proper washing and bathing are effective preventive measures.

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Bradley Washfountains are providing such facilities in thousands of plants. More than five million hands of industry are washed daily at Bradleys.

The central spray serves clean, running water to each of 8 to 10 persons simultaneously. The spacious deep bowl is self-flushing to prevent collection of water and possible contamination. Bradleys thus save space, reduce piping connection 70 to 90 per cent, reduce chance of skin affections that may spread and cause many lost man-hours.

Seven men washing at a Bradley 54-inch circular Washfountain. To show the spray, sprayhead and soap dispenser, men were cleared from side nearest camera.

Bradley Washroom Consultants to Help You

Let our experienced Washroom Consultants help you extend your present washrooms or lay out new ones. Their suggestions will save your time and assure the maximum facilities in given space. Bulletin 4010 will be mailed on request . . . BRADLEY WASHFOUNTAIN COMPANY, 2217 W. Michigan St., Milwaukee, Wis.

BRADLEY washfountains

eration is quick, simple and highly efficient.

Slings for handling the flasks, full or empty are worthy of comment. The straight member attached to the beam at the upper end, terminates at the lower end in a steel ring with an opening somewhat larger than the end of the flask trunnion. A second ring on the inside is mounted on ball bearings. The sling in a general way bears a close resemblance to the connecting rod on an engine.

Following the shakeout, rough cleaning and head and gate removal, the castings are annealed in car type furnaces where they are raised to a temperature of 1650 degrees Fahr., held an hour and then cooled and removed. Any adhering scale and sand are removed in a revolving blast pressure unit supplied by the Pangborn Corp., Hagerstown, Md. The castings arrive on roller conveyors and are suspended from a monorail by hooks inserted in the small opening in the pointed end. As they pass through the cabinet they are subjected to constant jets of metal abrasive thrown with great force against the surface.

Castings Cleaned Inside

This treatment would be sufficient for ordinary castings. Shells are not ordinary castings. The entire inner surface must be ground smooth and bright with special power driven abrasive shapes mounted at the end of long tubes and manipulated by hand. The castings are air tested and water tested. The small loop by which the finished and loaded bomb is suspended from the plane is a forging and is welded in place. Each casting is passed through a machine where it is tested for tensile strength test, first while the casting is in a horizontal position, and then while the casting reclines at an angle of 45 degrees.

Both ends of the castings are machined in a long battery of special lathes and then dipped in a tank containing a special coating compound. A metal cap is screwed into each end and then the castings are given a coat of paint and loaded in box cars for shipment to the location where they are loaded. Where they go after that is an item of news not available for publication. It may be east, it may be west, but no confidence is violated in the statement that quite a large number of people will shed no salty tears if one lands in the cuckoo's nest!

This is the second and concluding article dealing with the construction and operation of a shell casting steel foundry in Canada. Location and certain other features are not available for publication. Subject matter and illustrations are presented through the courtesy of the Department of Munitions and Supply, Ottawa. The first article appeared in the December issue of THE FOUNDRY.

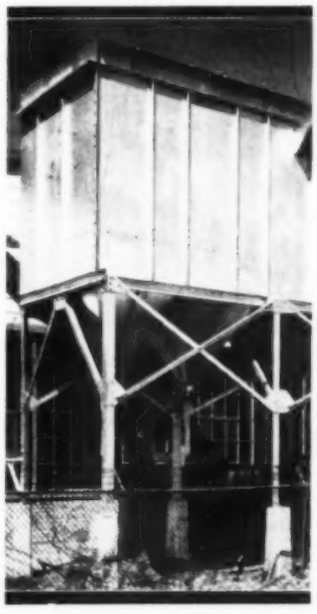
THE tax that is ignored is often the one that hurts most.

The dust tax is like that. You pay it without realizing it is there. It shows up in higher insurance rates, increased labor costs, and expensive repair bills.

Moreover, the fact that you have dust collecting equipment does not always mean that your dust condition is under perfect control. The dust you cannot see is what should concern you most. This is especially true of foundry dusts ranging between 2 and 10 microns in size.

When you consider that it is possible to place more than 3000 dust particles of $2\frac{1}{2}$ micron size on the head of a common pin, the necessity for high efficiency dust control becomes apparent.

American "Dustubes" provide this kind of protection at surprisingly low cost. They are extremely simple in design and are easy to operate and maintain. Hundreds are in daily use throughout the foundry industry.



AMERICAN FOUNDRY EQUIPMENT COMPANY
505 South Byrkit St., Mishawaka, Ind.

DUSTUBE
DUST COLLECTORS

FOUNDRY ACTIVITIES

SANDUSKY FOUNDRY & MACHINE CO., Sandusky, O., recently was awarded the Bureau of Ordnance flag and the Navy "E" pennant "in recognition of exceptional effort and production in the national emergency." Rear Admiral W. T. Cluverius, retired, now president of Worcester Polytechnic Institute, Worcester, Mass., made the presentation address at the meeting.

* * *

Western Foundry Co., Portland, Ore., recently was damaged to the extent of $10,000.

* * *

Gorham Tool Co., Detroit, will erect a foundry addition on Woodrow Wilson avenue.

* * *

Washington Iron Works, 1500 Sixth avenue South, Seattle, plans to make alterations to its plant.

* * *

Symington-Gould Corp., Rochester, N. Y., is considering building a foundry at cost of $500,000.

* * *

Concord Foundry & Machine Co., Concord, N. H., recently was damaged $1000 by fire.

* * *

Pacific Steel Castings Co., 1316 Second street, will build plant, to cost more than $40,000.

* * *

Landis Tool Co., Waynesboro, Pa., is planning to build a foundry addition, 171 x 306 feet, to cost $450,000.

* * *

Peerless Aluminum Castings Co., Bridgeport, Conn., will erect a one-story 65 x 144-foot foundry addition.

* * *

E. J. Scudder Foundry & Machine Co., Canal and Pearl streets, Trenton, N. J., has let contract for a $4000 foundry addition.

* * *

Humphrey Mfg. Co., Wayne street, Mansfield, O., has let contract for remodeling its foundry. Cost is estimated at $18,000.

* * *

General Metals Corp., 5701 South Boyle avenue, Los Angeles, is making alterations and improvements to its building at a cost of $15,000.

* * *

Penn Steel Casting Co., Chester, Pa., will install electric power equipment in connection with rebuilding portion of plant destroyed by fire.

* * *

Continental Roll & Steel Foundry Co., Pittsburgh, is planning the construction of a new plant at East Chicago, Ind., for the production of cast armor plate. The plant will be operated for the government and will cost $5,403,000. That company

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TANK-CAR

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•

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DOCO BINDER AND CORE PASTE

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THE DAYTON OIL CO.

Factory and General Offices

DAYTON, OHIO

now is working on expansions at its Pittsburgh plant and also at Wheeling, W. Va., both in connection with the cast armor plate program.

* * *

Dominion Foundries & Steel Ltd., Depew street, Hamilton, Ont., will build an addition to its armor plate department to cost about $250,000.

* * *

Vulcan Foundry Co., 4401 San Leandro street, Oakland, Calif., has awarded contract for foundry addition to cost about $40,000.

* * *

Scovill Mfg. Co., Waterbury, Conn., is erecting a one-story 44 x 182-foot addition. Estimated cost $40,000.

* * *

Oakland Foundry Co., Belleville, Wash. has been awarded a $12,000 contract by the War department for 25,000 grates.

* * *

United Engineering & Foundry Co., Youngstown, O., plans erection of a plant addition 85 x 275 feet and to cost $500,000.

* * *

Cunningham Steel Foundry Co., 4200 West Marginal Way, Seattle, plans plant alterations and expansion.

* * *

Union Mfg. Co., New Britain, Conn., is building a one-story addition to its plant. Cost will be close to $40,000 with equipment.

* * *

F. Ferguson & Co. Inc., 1122 Clinton avenue, Hoboken, N. J., is planning alterations and additions to its foundry. Estimated cost is $100,000.

* * *

Canadian Westinghouse Co. Ltd., Hamilton, Ont., is taking bids for further addition to its plant to cost about $50,000.

* * *

Continental Roll & Steel Foundry Co., Wheeling, W. Va., is taking bids for the erection of a manufacturing plant.

* * *

Cockshutt Plow Co. Ltd., Mohawk street, Brantford, Ont., is building a plant addition 60 x 114 feet to cost $40,000 with equipment.

* * *

Bohn Aluminum & Brass Corp., 1400 Lafayette building, Detroit, is considering erection of a $1,415,000 plant at Adrian, Mich.

* * *

Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., plans to build a one-story foundry building 120 x 350 feet.

* * *

Bishop & Babcock Mfg. Co., 4901 Hamilton avenue, Cleveland, Fred N. Mizer, president, is planning construction of a $35,000 furnace building for manufacture of small

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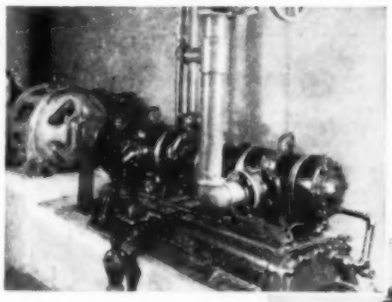
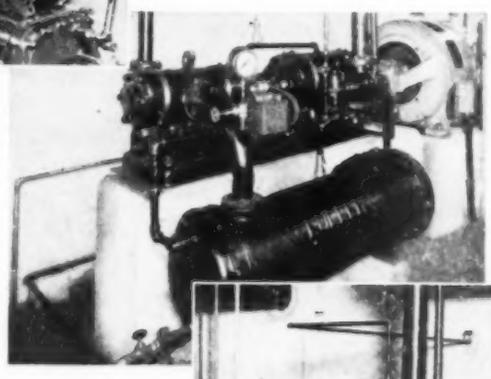
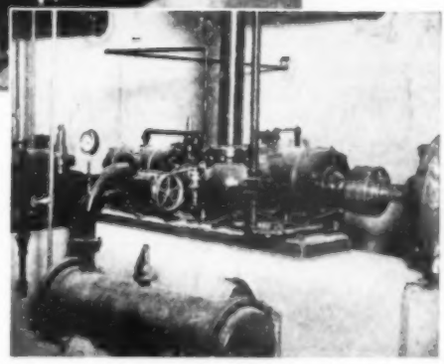
For Heavy-duty, Fuller Rotary Compressors demonstrate their worth . . . available for 80 to 125-lb. service.



Left: **234 C.F.M.** actual free-air delivery, **100-lb. pressure**, Two-stage Rotary Compressor, installed May, 1935, in an incinerator plant in Ohio. No repairs have been made on this machine since being installed. Three Fuller Rotaries are in use at this plant.



Center: **330 C.F.M.** actual free-air delivery, **100-lb. pressure**, Two-stage Rotary Compressor, installed February, 1936, in a foundry in Pennsylvania. This machine furnishes air for general plant duty. The records show expenditures of only $12.00 for repairs, to date. A pertinent factor to be considered when purchasing your next compressor.



Right: **470 C.F.M.** actual free-air delivery, **100-lb. pressure**, Two-stage Rotary Compressor, installed 1938, in a cement plant, for general plant duty. Three Fullers are installed in this plant.

Write for Bulletin C-3A

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C-52

FULLER

PIONEERS OF HIGH-EFFICIENCY ROTARY COMPRESSORS

shells. Plant will be located on East Fifty-fifth street near the lake front and will be equipped with hardening furnace and quenching pits.

* * *

Union Mfg. Co., New Britain, Conn., will build a one-story addition, 30 x 160 feet, to cost approximately $40,000 with equipment.

* * *

Cooper Alloy Foundry Co., Elizabethport, N. J., is moving to Hillside, N. J., where it is completing construction of a new foundry. It is expected that the Hillside plant will be equipped and ready for operation about Dec. 1. It has sold its Elizabethport plant to Eureka Iron Works Inc., Newark, N. J. The plant comprises about 25,000 square feet of floor space. *(Noted in September, 1941 issue.)*

* * *

It has been reported that the Defense Plant Corp. has authorized a $1,750,200 contract for a tank equipment factory to be operated by the Blaw-Knox Co., Pittsburgh. This would include an extension of the company's Union Steel Castings division, and the addition of equipment which would increase that division's output of armor castings.

* * *

Ajax Iron Works, Corry, Pa., is taking bids for a 9000-square foot addition to its plant and moving and re-erecting a 10,000-square foot building.

* * *

De Laval Steam Turbine Co., Nottingham Way, Trenton, N. J., has awarded contract for a factory addition to cost $22,000.

* * *

United Steel Corp., 58 Pelham avenue, Toronto, Ont., will build foundry to cost $25,000, equipment extra.

* * *

Joliette Steel Co. Ltd., Laval street, Joliet, Que., is installing a new electric furnace and transformers to cost about $30,000.

* * *

General Electric Co., Lynn, Mass., is building a one-story addition, 61 x 198 feet to cost over $65,000 with equipment.

* * *

Rothwell-Smith Brass Foundry, Pawtucket, R. I., plans a one-story foundry 80 x 100 feet to cost about $45,000 with equipment.

* * *

Scullin Steel Co., St. Louis, is installing an additional open-hearth furnace to increase its production capacity for armor plate for tanks.

* * *

Canadian General Electric Co. Ltd., Peterborough, Ont., has awarded general contract for an addition to its plant on Park street, to cost $500,000.

* * *

Canadian Car & Foundry Co., Montreal, Que., is taking bids for another addition to its plant on St. Patrick street, to cost approximately $75,000.

* * *

The name of the R & C Brass & Aluminum Foundry, Toledo, O., has been changed to Crayne Brass Foundry Co. There is no change in management.

* * *

Aluminum Foundry & Pattern Works, 4 St. Phillipe street, St. Laurent, Que., is completing plans for erection of a foundry to cost $40,000 with equipment.

* * *

W. Eckhardt has been issued a building permit for construction of an addition 25 x 26 feet to a foundry building 4921 San Fernando road, Los Angeles.

* * *

Wescott Valve Co., East St. Louis, Ill., is building a $3,000,000 plant for the manufacture of steel castings and valves for the Navy. The new

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In Defense Production

Listed below are some of the important jobs being done by Simplicity Shake-Outs and Sand Units in the Foundry Industry today.

★ ★ *Shaking out flasks and knocking out the castings in tank production. Castings consist of hulls, turrets, treads, and other miscellaneous cast parts. Loads up to 100 tons must be handled.*

★ ★ *Shaking out flasks and knocking out castings in fifteen aluminum and magnesium foundries.*

★ ★ *Shaking out various sizes of flasks carrying cast bombs of all sizes up to 1000 lb. bombs.*

★ ★ *Shaking out flasks, knocking out castings, and screening sand in 105 steel foundries.*

★ ★ *Screening and conditioning sand in 26 foundries operated by or for the Aviation Industry.*

SIMPLICITY ENGINEERING CO.

DURAND, MICHIGAN

For Canada: Waterous Limited, Brantford, Ontario

factory will be located on a 15-acre tract at 4200 Bond avenue and will include a steel foundry, machine shop and testing laboratory.

* * *

Rice-Barton Corp., Worcester, Mass., will spend approximately $42,000 for a one-story 50 x 160-foot foundry building and a one-story 16 x 28-foot core oven.

* * *

Puget Sound Navy yard, Puget Sound, Wash., is taking bids for a foundry and pattern shop 61 x 121 feet and 100 x 156 feet at Keyport naval torpedo station.

* * *

Sully Brass Foundry, 7 Wabash avenue, Toronto, Ont., has let general contract for erection of two-story plant addition to cost $25,000, equipment extra.

* * *

Alloy Castings Inc., Beacon street, Rockford, Ill., has been incorporated by A. F. Ahlstrand, P. V. Hogland and A. O. Ahlstrand to operate a foundry and machine shop.

* * *

Hull Iron & Steel Foundries, Montcalm street, Hull, Que., is having plans prepared for addition to its foundry to cost with equipment, about $60,000.

* * *

J. East Iron Works, Avenue "C," Saskatoon, Sask., is having plans prepared for addition to its foundry to cost about $35,000, including equipment.

* * *

American Steel Castings Co., Newark, N. J., has awarded contract for the construction of a one-story pattern shop, machine shop and foundry addition to cost $200,000. Defense Plant Corp. will finance.

* * *

General Alloys Co., Boston, is building plant for manufacture of aircraft equipment. Defense Plant Corp. will finance. Cost estimated over $90,000 including machinery and equipment.

* * *

George D. Roper Corp., Rockford, Ill., is planning the construction of a $600,000 addition to its plant for the manufacture of 75-millimeter armor piercing components.

* * *

The plant formerly operated by the Ashton Equipment Co., Watervliet, Mich., has been leased by August Frank and Edward Schultz, whose foundry in Coloma, Mich., was destroyed by fire recently.

* * *

Western Foundry Co., 2400 South West Water street, Portland, Ore., has purchased half a block at South West Moody and Baker street, Portland. The land is to be used for a

VITAL
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PANGBORN Dust Collectors are silent sentinels standing guard over large and small industrial plants.
Wherever dust is produced they quickly, efficiently and economically collect it at its source—protecting your products, your equipment and your working conditions.
Don't fool yourself about DUST. It is a BIG problem in EVERY PLANT. Yet it can be CONTROLLED. For interesting data and bulletins "COME TO PANGBORN"—and get valuable facts about these vital "Air Wardens" of Industry. No obligation, of course.
PANGBORN
WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT
PANGBORN CORPORATION · HAGERSTOWN, MD.

stock and scrap yard and approximately $2000 is being spent on improvements.

* * *

Defense Plant Corp. has authorized execution of a lease agreement with Kilby Steel Co., Anniston, Ala., to provide for purchase of machinery costing $40,000 for installation in plant to be used in manufacture of ordnance equipment.

* * *

Thomas W. Simmons, president, Bolsa Chica Oil Corp., Los Angeles, has completed negotiations for the purchase of the Bass Foundry Co., Fort Wayne, Ind., and for the purchase of Pacific Iron & Steel Works, Tacoma, Wash.

* * *

Wellman Bronze & Aluminum Co., Cleveland, has started production in its new magnesium foundry located at 2525 East Ninety-third street, Cleveland. The foundry produces castings for airplane landing wheels and other aircraft parts.

* * *

Rite Hardware Mfg. Co., Glendale, Calif., is erecting a new foundry building 40 x 60 feet at 540 Chevy Chase avenue. It will be a wood frame and corrugated iron structure together with a reinforced brick factory and office building 60 x 165 feet and to cost $20,000.

* * *

General Steel Castings Corp., Granite City, Ill., is building a plant to cost $14,000,000, and to be financed by the Defense Plant Corp. for the production of cast steel turrets and hulls. It is expected operations will be started in the new plant about July 1, 1942.

Decrease Sizes for Pipe Fittings

A new simplified practice recommendation for pipe fittings covering sizes of gray cast iron, malleable iron, and brass or bronze fittings recommended for production as regular stock items has just been approved for promulgation, according to an announcement of the Division of Simplified Practice, National Bureau of Standards. The new recommendation will be identified as Simplified Practice Recommendation R185-42, Pipe Fittings (gray cast iron, malleable iron and brass or bronze), and will be effective for new production from January 1.

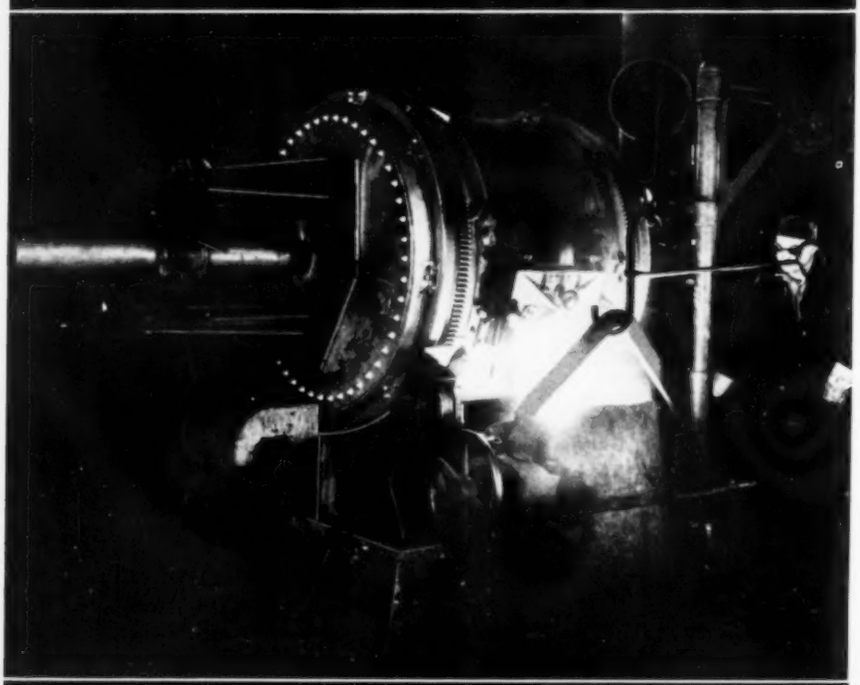
A survey of the industry conducted early in 1941 disclosed that over 8500 kinds, types, and sizes of fittings were being offered regularly by the industry. Careful study of the sales of each of these many varieties showed that demand was concentrated on about 3000 items. It was obvious that the continued stocking of the other 5500 varieties, which moved but slowly, tied up considerable material in finished inventories and on dealers' shelves, and complicated the productive processes with thousands of short runs.

The simplified schedule, therefore, recommends the continued production for stock of but 1311 of the 4964 gray cast iron fittings heretofore offered; of 1169 of the 2331 malleable iron fittings, unions, and union fittings, and 487 of the 1271 brass or bronze screwed fittings, unions, and union fittings, heretofore stocked. The retained items, it is estimated will satisfy 92 to 94 per cent of all consumer demand.

Until the printed issue is available, mimeographed copies of this recommendation may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington.

Shea-Brownell Co., 3908 Olive street, St. Louis, has been appointed exclusive representatives for Despatch Oven Co. in the Missouri territory. B. M. Brownell has had many years of practical experience in the oven and furnace field.

Speeding up Production for World War II



Designed during World War I to effect savings in labor and metal losses, and to get the utmost production from available plant space, Detroit Rocking Electric Furnaces are again today a vital factor in speeding up the production of defense materials.

With a Detroit furnace you get accurate control over temperature and composition. You get fast melting; a uniform dependable product; ease of control and improved working conditions. For all around economy you simply cannot beat a Detroit Rocking Electric Furnace. Write us about your melting problems.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY · BAY CITY MICHIGAN

CO-OPERATION TO FEATURE CONGRESS

(*Continued from page 72*)

apportioned between the steel castings, gray iron castings, malleable iron castings and nonferrous divisions. Already an imposing list of noted foundry metallurgists have been scheduled for papers.

The Malleable division feature will be a symposium on graphitization. Carl Joseph, Saginaw Malleable Iron division., General Motors Corp., chairman of the malleable division program committee, has arranged to have Dr. Harry A. Schwartz, National Malleable & Steel Castings Co., Cleveland, lead the symposium. Other contributions will be made by Dr. Richard Schneidewind, University of Michigan; R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis.; W. D. McMillan, International Harvester Co., Chicago; W. R. Bean, Whiting Corp., Harvey, Ill.; R. J. Cowan, Surface Combustion Co., Toledo, O.; A. L. Boegehold, General Motors Research Lab., Detroit; D. P. Forbes, Gunite Foundries Corp., Rockford, Ill.; and R. M. Cherry, General Electric Co., Schenectady, N. Y.

Plan Shop Courses

Two shop courses offering fundamental instruction on sand control and shrinkage to plant men are scheduled. The first of these, under the sand shop course committee with E. E. Woodliff, Harry W. Dietert Co., Detroit, as chairman, will present four sessions on "Fundamentals of Sand Control." Leader of the meetings will be W. G. Reichert, American Brake Shoe and Foundry Co., Mahwah, N. J. The sessions will be designed for the benefit of the younger men of the industry interested in knowing how to carry on sand control in those shops where such control has not been exercised.

The gray iron shop course committee, under the chairmanship of K. H. Priestley, Eaton-Erb Foundry division, Eaton Mfg. Co., Vassar, Mich., is to sponsor four sessions on "Shrinkage of Cast Iron," dealing with the fundamentals as they apply to risering and heading castings.

General plant operating problems will be stressed in sessions on pattern making, sand research and refractories. An important section of the convention meetings will be sessions devoted to the completion of the lecture course on core practices and theories as given by H. W. Dietert started last year. The material of these lectures will be avail-

Make TIME SPACE LABOR Count

"CONVEYORIZE" Your Handling

Saving valuable time—using plant space more effectively—releasing man-power for more productive work—Standard Conveyor engineers have proved these benefits for hundreds of manufacturers—and can do the same for your company. Here are typical examples:

"... found that we saved 150% of the cost of the conveyor in handling this one cargo of pulp as against the cost of unloading previous cargoes."—from the report of a prominent paper mill.

"We believe that due to the present arrangement of our compound department, including conveyors, we have gained approximately 65% floor or storage space, and showed a saving in handling costs of 56%."—a nationally known rubber manufacturer.

"... one of the greatest time and labor saving devices we have ever used—paid for itself in less than 12 months."—statement of prominent food manufacturer.

"... we selected your type of roller conveyor ... because we felt that the contour of your steel roller is very favorable to the transportation of shells which have a finish turned copper band on them. The concave roller gives the band a two-point contact and consequently reduces the liability of damage by over 50% over what it would be if the rollers were straight or just slightly concave."—report from large armament plant where Standard Conveyors are used for fast, safe "line" production of 3 inch A. A. shell.

Call In A Standard Conveyor Engineer

—Check with him to see how Standard Conveyors can aid you to make men and machines more productive in your plant. Write for bulletin F-1 "Conveyors by Standard"—a valuable reference book on conveying, containing data on many representative installations.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul, Minn.
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FIRST FOR FASTER PRODUCTION

"THE STANDARD OF VALUE"

Standard CONVEYORS

able in book form, comprising a vast amount of data on all phases of core practices, including binders, baking, production, equipment, sands and processing. In compiling this material, Mr. Dietert has been assisted by a large number of men in the industry who have submitted data collected from plant practices.

Johns-Manville Corp., New York, is constructing an asbestos mill for processing large quantities of asbestos bearing rock on the company's properties in Chrysotile, Ariz.

Adventures of Bill

(*Concluded from page 84*)

tuyeres and start the blower. The tap hole of course is closed with a piece of core or a handfull of molding sand. Watch the metal through one of the tuyeres peep holes and tap before it rises too high. Shut off the blast after the first tap. The remainder of the metal will come down by itself.

Heat the ladle with an oil torch or with a good wood fire. In the second instance the wood ash is left in the ladle and in both instances before the metal is tapped, enough charcoal is shoveled into the ladle to provide a cover for the metal. Phosphor copper, approximately 1 ounce per 100 pounds of metal is stirred into the ladle to deoxidize the metal. Additional degasification is secured by stirring the metal with a green wood pole. Ordinary precautions of course are observed in introducing the pole into the metal to prevent the metal from exploding.

With a miscellaneous charge the exact analysis cannot be predicted accurately. A small amount is lifted with a spoon ladle and spilled into any convenient form of test block. The piece is cooled, broken and the fracture examined. With a little experience the melter can determine what additions are necessary. Where the metal is extra hot a considerable amount of tin, zinc, lead or other metal may be added. Under other conditions it is advisable to either heat the addition red hot, or melt it in a small crucible and pour the required amount into the large ladle. On a 1500-pound total charge you may expect a melting loss of 1 per cent tin and zinc. Copper and lead come through practically intact.

PARSONS

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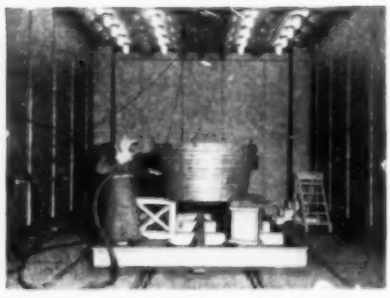
SAVE TIME by eliminating dusty, uncomfortable working conditions which cause production slowdowns. Parsons Oval Bag Dust Arrestors hold their original high efficiency because the oval bags will not plug even when handling dust from moist materials. Write for Bulletin DA-6.

Time Savers

BLAST ROOMS

SAVE TIME. No handicap to workmen here. Scientifically correct lighting and complete downdraft ventilation enable work to be clearly seen from every angle—and a constant flow of clean, proper size abrasive is always at the gun. The result—bigger output for defense. Write for Bulletin R-41.



GRIT *Blast* . . SHOT *Blast* . . SAND *Blast*

SAND BLAST CABINETS

DISTRIBUTORS OF INDUSTRIAL METAL ABRASIVES

Prompt delivery of both shot and grit. Write for SAMPLES.

Built by

PARSONS ENGINEERING CORP.

CLEVELAND, OHIO

THE NAME PLATE THAT MEANS QUALITY

PARSONS

Freeze Prices for Steel Castings

Prices for carbon and low alloy steel castings, including railroad specialties, are "frozen" at current levels which are those prevailing since July 15, under a price schedule announced recently by OPA and effective Nov. 15. Maximum prices are referred to in the schedule.

Except for railroad specialties such maximums will approximate those in the Comprehensive Report of Price Lists of Miscellaneous Castings issued by the Steel Founders Society for the third quarter of 1941. Any miscellaneous castings for which prices are not determined by this publication are held at levels not exceeding the July 15 prices.

Special provision is made for prices of castings not previously produced by a manufacturer. However, the schedule requires that data on such castings must be filed with OPA along with the proposed maximum selling price when part of an order totals $100 or more.

Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, O., recently opened a new warehouse at 2066 Random road, Cleveland. In addition to a complete stock of wheels, the new warehouse provides machinery for facing, countersinking, rebushing and cutting wheels for specific dimensions and operating demands.

PLANNING THE NONFERROUS FOUNDRY

(*Continued from page* 67)

place for the movement of material including product and supplies must pass up and down these aisles in trucks, wheel barrows and all the other different types of equipment which serve best to deliver or move these materials at the most economical cost. Therefore, the aisles must be paved with a floor that will meet this service with a minimum of expense for maintenance and renewal. The designer of the foundry who has this problem in hand has offered to him a wide variety of different materials with which to pave this part of the foundry floor. A careful study of these and the choice of the one that will withstand the service best even if it is a very high first cost will pay for itself many times over in reduced expense thereafter and therefore should be chosen without any question.

Shop To Be Ventilated

Ventilation of the foundry should be adequate as we have said before but to do this an artificial supply of fresh air must at all times be made available to replace that air that is driven out of the plant through the ventilators in the roof or through such ventilators as are provided in the side walls. Consequently, fans must be located at the proper points to feed fresh air to the molders, core makers and other workers in sufficient quantities to replace that passing out and to insure an abundant supply of uncontaminated fresh air for their use so as to avoid any tendency to permit the breathing on the part of these workers of any of the objectionable fumes that occasionally are found in the foundry.

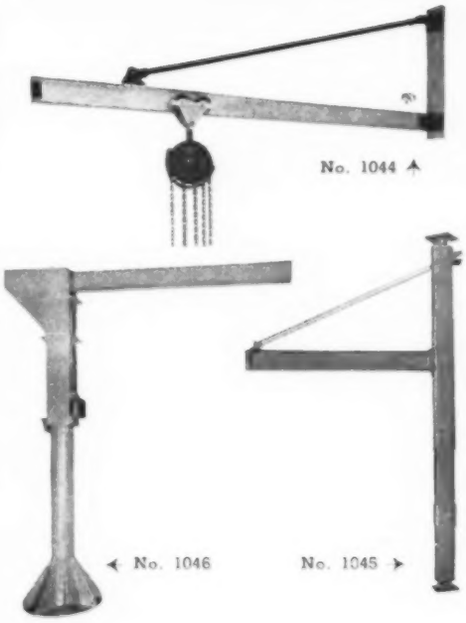
Such ventilating apparatus should be provided with heating equipment so that in the seasons when heating is necessary this supply of fresh air is heated to a temperature that will insure the comfort of all operators without being exposed to chilly drafts. Such air supply should be led into the foundry at the lower levels, approximately that level at which a man breathes. This will insure the fresh air passing down around the zone in which the man works and forcing out of that zone the vapor laden air that is heated and therefore rises up into the roof pockets to pass out and be dispersed.

Where it is possible molders should not be spaced any closer to one another than about seven foot centers. This will give them ample elbow room, room for molding machine if the work will permit a molding machine operation and ample room for a pair of mold racks to be located where the molds may be placed for pouring.

If the land available will permit the molding bay to be wide enough it will be found advantageous to have each molder have a space approximately 7 feet wide and 30 feet long. That will give room at one end for the machine and from the machine out to the other end the skids or mold racks will be sufficiently long to accommodate a series of molds embracing some that are cooling off, some that are waiting to be poured, enough to take a ladle or a crucible full, and some that are being taken to the shake out floor. That, of course, refers only to the foundries that do not have mass production equipment including conveyors to carry the molds to pouring stands and to shake out floors, etc.

If each molder is to have an individual sand heap it will be found that he will require a larger width in order to accommodate a molding machine and have the sand heap located in a convenient position to insure minimum labor for transferring sand from the heap to the mold he is producing. Obviously the overhead hop-

Need a GOOD JIB CRANE in a HURRY?



■ Easily and quickly installed in your foundry to speed up production. CHICAGO jib cranes, constructed in our own plant to your specifications, are unusually well-made and moderately priced.

WALL TYPE—No. 1044

■ This swinging bracket jib crane is a popular unit. For hand or electric hoist, it comes in capacities of ½ to 3 tons and up to 20 ft. radius.

MAST TYPE—No. 1045

■ Ideally suited for capacities to 5 tons. For either hand or electric hoist. Complete circle swing. Made for your requirements.

PILLAR TYPE—No. 1046

■ A strong unit with self-supporting jib crane with complete circle-swing. Capacities ½ to 2 ton with 20 foot radius. Built to last.

Special service cranes also designed for any unusual foundry need.

CHICAGO Knows A Foundry's Problems

■ We have specialized in the design and construction of foundry materials handling equipment for many years—it will be worth your while to let CHICAGO submit bids on your next job, large or small.

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per in which the sand is stored that permits dropping of sand from the hopper to the machine is to be preferred since it reduces the space between molders and consequently increases the number of molders that a given foundry can accommodate.

Problem of delivering the molten metal from the furnace to the different molding floors must be considered carefully in planning a foundry. There are a wide variety of different types of overhead conveyor systems all of which have their good points and many of which have given many years of most satisfactory service under certain conditions in certain plants. In planning this part of the foundry the engineer will do well to bear in mind that the atmosphere of the foundry is necessarily dusty and the accumulation of dust on the overhead trolley systems serves to increase wear and to increase maintenance expense.

Such a system must be fool proof in terms of possibilities for the workmen to have accidents. Spilling of hot metal is one of the most serious accidents that can happen in the foundry. Therefore, the overhead system that will guarantee the delivery of this hot molten metal from furnace to mold with a minimum number of casualties and the least amount of danger to workmen is the one to be preferred, all other conditions being equal.

Obviously the time necessary for transfer of metal from furnace to mold is of prime importance since there is a definite temperature drop for every period of time during which the metal waits before being poured into the mold. That means it is desirable to have a fast transportation system for the movement of metal, a safe one and one that is least damaged by dust and constant use and service.

Question of minimum time for the metal from furnace to mold brings up the advisability of planning the location of the furnace department at a most central point where the distance from furnace to molds is the minimum compatible with the economical operation of the plant from other standpoints and compatible with the available storage of the necessary raw materials and metals.

Arrange Departments in Order

One additional feature which is relatively important when planning a foundry, is the location of the departments with respect to one another. Metal storage should be handy to the place where the metals are to be melted in the furnace department. The furnace department must be convenient to the floors upon which the metal is to be poured. The castings travel to the cleaning department which should be located in an economical position with respect to the foundry. From the cleaning department the castings should pass by logical sequence to the inspectors and then to the shipping department if they are to be shipped or to the machine shops if they are to be machined.

A logical sequence such as described should be planned carefully so that there is no expense for double handling of product or supplies. The necessary offices which are incident to the proper control of such a foundry should be so located as to require a minimum amount of effort and time waste to supervise and gather the necessary records and control sheets properly to maintain the continuous flow of product at a minimum cost and a maximum speed of production.

Accurate control of the charges of metal put into the furnaces is essential which means some form of laboratory analytical control to insure a check on the procedure in the furnace department that will correct mistaken practice before it becomes disastrous. Adequate laboratory control of melting practice includes the study of the combustion conditions in the furnaces. It includes the study of the kind of refractories that are being used with a view to in-

"C-GRADE"
CORE OIL

Marine Engine Water Jacket and Exhaust Manifold cores.

The foundry making the cores shown above, after many tests, adopted "C-GRADE" Core Oil to obtain the perfect castings necessary in an engine of this type and to eliminate core blowing trouble.

The manifold core shown here is 30" long and through the use of "C-GRADE" Core Oil, venting was entirely eliminated.

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CORE PASTE SEACOAL PARTINGS CORE WASHES

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suring the best that can be secured in the interest of reducing maintenance costs and minimum loss of time for repair. Proper control of the conditions of the sand heap requires adequate sand control consisting of sand sampling and testing and the prompt change of practice when such tests indicate the need.

Hence, the analytical laboratory can serve the foundry very effectively if it is equipped to check the different types of sands purchased, the different grades of refractories purchased, the different kinds of binders used in the core room, to see that the fuel purchases are of uniform quality and fully up to the specifications of the plant. Many other places will be found where the laboratory can make for economical production, and low cost.

Laboratory Location Important

Therefore, the laboratory must be located where it is convenient to the intimate control of all of the steps for which it is equipped to control. To locate the laboratory off in some little corner where the incumbent is liable to find a soft spot in which to take a snooze or where the foundry foremen and superintendent find it a good deal of trouble to visit and go over their foundry problems would only result in the laboratory rapidly becoming an ornament which is spoken of by possibly the advertising department or some of the salesmen but is little used.

Sand control and furnace control and metal analysis are all so vital to the success of the modern nonferrous foundry that the laboratory should be recognized as something that must be located in the original design as one of the most important departments where every convenience should be provided for precise work and reliable results. Good light, good ventilation and good equipment in this department will be found to pay handsome dividends.

This is the second article of a series relating to the principles to be observed in arranging the nonferrous foundry for efficient and economical production. The first appeared in the December issue.

THE EDITORS.

Conclude Elastic Property Tests

Tests recently concluded at the National Bureau of Standards have developed much needed data on the elastic properties of three types of alloy cast iron, according to the Department of Commerce. This information is particularly important under present emergency conditions when, because of the difficulty in obtaining steel shapes, cast iron is being used to a rapidly increasing extent for many structural parts, in addition to such familiar applications as piston rings, cylinder liners and similar products.

The tests, conducted by Col. A. I. Krynitsky and C. M. Saeger, Jr., were made in the bureau's experimental foundry under conditions approximating commercial practice. Transverse strength, deflection, resilience and hardness measurements were made on test bars from iron which had been melted in a high-frequency induction furnace. Before pouring the metals were heated to various temperatures above the point at which the iron liquified.

Maximum heating was shown to be of greater benefit in the case of plain carbon irons than alloy irons, while the effect of pouring temperature on plain carbon and alloy irons was about the same, both kinds showing a tendency to become weaker and less elastic as the temperature was raised.

Vapor Blast Mfg. Co., recently has moved to new and larger quarters at 333 South Sixteenth street, Milwaukee. The new location triples the company's former floor space and offers more room for assembly, laboratory, testing, engineering, and shipping facilities.

The applause has died down, the champagne bottle is broken, the general has snorted in his beard . . . Another ship is on the ways, ready for service.

When we launched our ship over 50 years ago, we endeavored to build on a sound foundation of responsibility to the trade, good judgment, and real service to the industry.

Our nine points of contact today are located to further this element of service. Our staff is ready to give you the best of their abilities in supplying your requirements for ferro-alloys, pig iron, coal, coke, shot and grit. May we hear from you?

Hickman, Williams & Co.
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ST. LOUIS DETROIT NEW YORK PITTSBURGH MINNEAPOLIS

CASTINGS MUST BE PERFECT

(*Continued from page* 61)

necessity where green help constantly has to be broken in to meet expanded production schedules. The various illustrations show that almost the entire crew is made up of young men, recruited locally. They are smart, intelligent and rapidly become adept in performing the duties to which they are assigned. Up to the present no women have been employed. Even in the office a number of young men attend to all the clerical work. Incidentally the office is small, plain and simple, part of the work shop instead of an ornate, over-staffed and expensive appendage.

Returning to the pattern illustration for a moment it will be noted that at one point and in some instances at two points in the runner a skimmer core is inserted to catch any stray particles of sand or other foreign material that accidentally have entered through the sprue. Advantage is taken of the fact that this material usually is lighter than the iron and flows on top of the stream. The metal flows under the core at this point in the runner that serves as a dam. Naturally the number and position of gates vary for different types of castings, but the general principle of providing gates that will admit the metal rapidly is observed throughout.

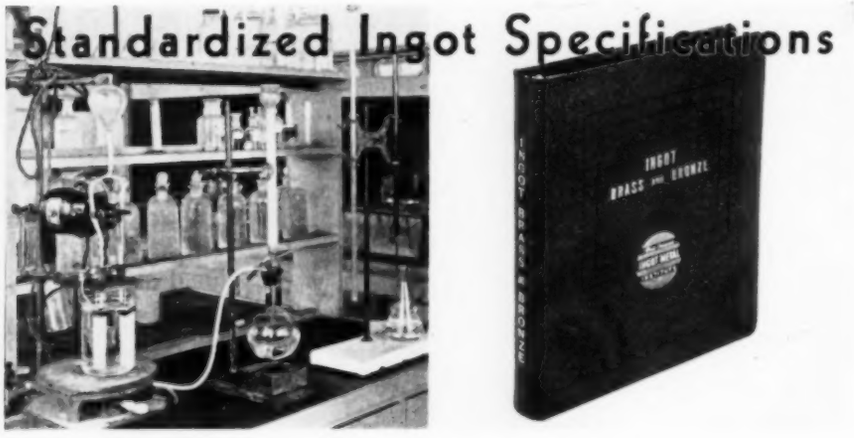
Sand and other materials are stored inside the north end of the foundry building. Core sand is prepared according to several formulas in a muller made by the National Engineering Co., Chicago, and distributed to the core room in steel boxes provided with handles on the upper corners for transportation by the crane, and also mounted on small wheels for manipulation on the concrete floor. A general view of the core room is shown in Fig. 12 with a battery of car type ovens in the central background and a drawer type oven for the smaller cores at the right. A transfer car mounted on a depressed track at the back of the ovens as shown in Fig. 6 may be spotted accurately for entrance or withdrawal of the loaded cars. The oil fired ovens made by the Foundry Equipment Co., Cleveland, are provided with all the modern devices for maximum utilization of heat, maintenance of temperatures and pyrometric records. On the opposite side of the track the cores are removed from the cars, inspected, gaged and stored until needed.

Molds Made in Green Sand

With the exception of the larger sizes, all the molds are green sand made in iron flasks. The large molds are black washed, covered with light steel sheets and skin dried with a multiplicity of gas jets thrown from an arrangement of piping designed to fit the general contour of the mold. Drying the face of the mold removes many of the hazards incident to green sand molding. Usually the time saved in cleaning the casting compensates for the slight expense incurred in skin drying the face of the mold.

To facilitate molding and divide the work between two gangs, the lathe bed or body patterns are split through the center longitudinally so that cope and drag may be molded side by side simultaneously. Each half pattern is attached in proper position on the board so that cope and drag will coincide when the mold is closed. The flask pin holes are drilled through a jig and as a result the parts are interchangeable.

The arrangement saves time and removes one of the hazards always present where the human element is involved. Location of the pattern



How Many Specifications Do You Require?

Consider the infinite variety of nonferrous parts required as America turns out everything from automobiles to battleships.

Then consider this: Identified with the growth of U. S. industry since 1880, Ajax has produced ingot and alloys to specifications covering, in the aggregate, virtually the entire range of nonferrous casting application or usefulness today.

Thus your requirements are met invariably with knowledge, with a solid grasp of procedures which begin *after* we deliver—as well as before. This applies to all your specifications—including NFIMI, ASTM, SAE, Federal, Naval, and the others.

The result is ingot metal and practical technical follow-through in which, *as always with Ajax*, you have implicit confidence.

15 STANDARD ALLOYS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax Nickel-Copper 50-50%
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

The first program for scientific control of ingot metal production was set up in and by the Ajax Metal Company 44 years ago.

Investigate These Alloys

THE AJAX METAL COMPANY
ESTABLISHED 1880 PHILADELPHIA

ASSOCIATE COMPANIES: AJAX ELECTRIC FURNACE CORPORATION, *Ajax-Wyatt Induction Furnaces for Melting*
AJAX ELECTROTHERMIC CORPORATION, *Ajax-Northrup Induction Furnaces for Melting, Heating*
AJAX ELECTRIC COMPANY, INC., *Electric Salt Bath Furnaces*

is accurate and positive and the joint line of the mold is more uniform than where the cope half of the mold is rammed on top of the drag. Fins along the joint also are reduced to a minimum with a consequent reduction in the time required to remove them during the cleaning operation.

With this type of layout the ways on the casting are on the side instead of on the bottom of the casting. This represents a departure from the standard or orthodox practice in which the V-guides or ways on lathe or planer invariably occupied the lowest area in the mold. The practice of course is based on the fact that the metal in the bottom of a casting is cleaner and denser than metal in the upper part of the casting. At the Sterling Foundry where the composition of the iron has been developed to a state of uniformity to meet the exacting requirements of a machine tool company jealous of a high reputation, the position of the casting in the mold is not a factor of major importance.

Describe Iron Qualities

Development of an iron to meet the exacting requirements of machine tool castings has engaged the attention of the management. A detailed account of the experimental work along this line was presented by Frank J. Dost, superintendent and secretary of the company, at a meeting of the American Society of Mechanical Engineers, June 17-20, 1940 in Milwaukee. The following excerpts indicate the character of the problem presented at the beginning of the investigation. Also the theory developed on the subject of free ferrite and its effect on the galling property of metal parts in sliding contact.

"Up until about 10 years ago the conventional semisteel mixtures of the high carbon, low silicon type were used for cast beds, frames and sliding members. Where the composition was adjusted to give a dense structure and high finish in the heavy sections, hard corners and edges usually appeared on the lighter sections. When the mixture was adjusted to make the light sections machinable, the heavy sections were not as dense as necessary and the machine finish was not up to the desired standard.

"Nickel as a stabilizer in this type of iron controlled the variations. As a rule the total carbon content was governed by adjusting the silicon to the metal section. Upper and lower silicon limits were set as standards for certain sizes of castings, but when the carbon varied parallel up or down with the silicon, either open grain or hard castings resulted. Increased demand for more uniform castings, better finish, greater wear resistance, a high strength type of iron was adopted. This iron mixture contained from 70 to 90 per cent steel, with resulting low carbon and high silicon.

"The high strength or low total carbon iron showed marked improvement, as a much more machinable hardness was obtained, also excellent finish and less sensitivity to heavy and light sections in the same casting. The iron was dense in 4-inch sections and machined readily in ⅜-inch sections, even though the Brinell hardness showed a decided increase over the high carbon, low silicon iron. One mixture of low carbon iron sufficed for two or three mixtures of the high carbon, low silicon iron.

"By controlling the carbon at the lower limits 2.70-2.85 per cent, higher hardness could be obtained in the range of 241 to 269 Brinell and the machine finish was excellent. From every standpoint, good machinability, high hardness, excellent machined finish and higher rigidity with less warpage without aging, this type of iron was ideal with but one exception, an occasional case of scoring or galling of the wearing surfaces or ways.

Castings on the move

Whisk them through the Foundry;
Zip them through the Cleaning Room.

Use the following to shorten long jobs and eliminate unnecessary ones.

LION BINDER - A strong, fast drying paste; tie wires not needed. A strong binder that bakes very fast.

EASY CLEANER CORE COMPOUND - Makes cores that clean out of the castings readily.

VULCAN BLACKING - Can be adapted to swift application; gives good surface, cleans speedily.

DUST-ON FACING - Shake it on green sand molds, close and pour. No tooling. Fast cleaning.

SUPERIOR PLUMBAGO - Rubs in immediately; doesn't "lift" the sand - - peels beautifully.

SILKOTE - Paint or spray on steel foundry cores, dry sand molds and skin dried work. Adaptable to fast application. Casting surfaces are really clean.

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FOUNDRY FACINGS · SUPPLIES · EQUIPMENT

"An investigation was started which led later to a comprehensive study involving about 2 years work and entailed making approximately 10,000 chemical determinations and 4000 microscopic examinations."

As a result of this extended series of experiments, the investigators were led to the conclusion that the presence of primary ferrite was responsible for the galling tendency in the castings. So far as published records show, this theory of Mr. Dost's is original and has not formed the base of exploration by any other investigator. Temperatures above a certain definite range produce primary ferrite or free cementite. Slower cooling rates tend to form secondary ferrite. Primary ferrite areas were found in castings in which the carbon content was somewhat below normal. Irons heated to 2850 degrees Fahr. or over showed a greater tendency toward production of primary graphite than similar irons heated to a lower temperature, even though the pouring temperature remained the same.

In the early experiments graphite was added to metal in the ladle to induce flake formation by seeding or the introduction of graphite nuclei. The treatment showed a definite improvement in the metal. Further improvement was found by supplementing the graphite with varying amounts of ferrosilicon. A commercial compound of carbon and silicon in various combinations produced good results in keeping the primary formation at the cast surface. Later this was changed to combinations of ferrosilicon and ferrochromium. In the latest set of experiments ferrosilicon is added at the spout. The silicon is reduced 25 to 50 points in the base mixture and then replaced by the spout addition. Formation of small amounts or primary ferrite has not been entirely eliminated, but it is confined to relatively small areas where it is removed in the machining operation.

Use Several Test Blocks

Different types of test blocks shown in Fig. 7 are employed for checking the progress of the heat each day, and for more extensive examination and record afterward. The quick test chill block at the left is formed in a green sand mold where the bottom and one side of the mold are iron chills. Iron poured into this mold is chilled to a certain depth depending on the composition. By breaking the chill block and noting the depth of chill the person in charge of the operation knows whether the metal is suitable for use in any given class of castings. Where the test shows a marked variation from the desired standards, remedial measures may be applied before the metal is poured into the molds.

The test block at the right of the group was developed specially to show the condition of the metal in the interior of a heavy section. The block first is broken across the center for visual examination of the fracture. Then two narrow channels are cut about 1 inch apart and the 3-corner piece is knocked out and subjected to chemical and physical tests.

Metal is melted in two cupolas, one lined to 48 and the other to 54 inches inside diameter. The cupolas erected side by side and served by the same charging platform are located in the east bay of the foundry with the spouts projecting into the main bay for the convenience of the cranes handling the ladles. Blast is put on the smaller cupola about 11 a.m. and the bottom is dropped at noon. The larger cupola is blown in about 1 p.m. and melts the remainder of the iron required for the day.

Wheelco Instruments Co., formerly located at 2001 South Halsted street, Chicago, has recently moved into its own building which is located at Harrison and Peoria streets, Chicago.

THIS briefly sums up the reasons for the outstanding performance that has gained wide acceptance for LANLY CORE OVENS in leading foundries throughout the country.

THE HEATING UNIT is remarkable for *economy* of gas consumption, *compactness* of design and *flexibility* of installation.

THE SYSTEM OF CONTROL and APPLICATION of HEAT inside the thoroughly *insulated* oven assures *even* distribution of *uniform* heat. Large or small, simple or intricate cores dry *thoroughly* regardless of their position in the oven.

The EXHAUST SYSTEM expels the baked out moisture with a high degree of efficiency that utilizes every available b.t.u. in the fuel consumed.

In a LANLY OVEN you will obtain the best possible results with unexcelled economy of operation. If you need a large car type oven, a portable rack oven, a drawer type oven or a unit especially adapted for drying plaster moulds, write LANLY today for a proposition.

THE LANLY CO.
CORE OVENS

750 PROSPECT AVE. CLEVELAND, O.

IMPROVING CUPOLA PERFORMANCE

(*Continued from page* 63)

Most likely those fuel units are somewhat less than you are now using and in many cases a great deal less. Coke charges are frequently 20 to 40 pounds per square foot.

The iron charge should be 8½ to 12 times the weight of the fuel charge using 8½ times the fuel charge when the charge contains say 60 per cent or more of steel and 12 times the fuel charge when the charge contains 10 to 20 per cent steel or no steel and when this end point is attained by gradual steps. Thus, for a 36-inch cupola using a 65-pound coke charge, the iron charge would vary from 550 pounds to 780 pounds, the iron charge for a 48-inch cupola using a 115-pound coke charge would vary from 980 pounds to 1380 pounds and the iron charge for a 60-inch cupola, using a 175-pound coke charge, would vary from 1480 to 2100 pounds.

Keep Coke Constant

It is essential to keep the coke charge a fixed figure for any given cupola and vary the iron charge to suit rather than fix the iron charge and vary the fuel charge. While we pause to "stop, look and listen" at the time of figuring the iron charge another point should be considered. That concerns our attitude concerning the rigidity of cupola operations versus the flexibility that is really ours if we only develop it.

For example, if we have been using a 2000-pound iron charge, we are likely to accept the rigidity of this 2000-pounds, and when we only need 1000 pounds, we either hold up molding a job until we have more patterns calling for the same iron or we melt 2000 pounds to fill a 1000-pound requirement and try to find some other mold on the floor to take the excess iron or wind up pigging it. The cupola has an element of flexibility which should be used and where you have been using a large charge unit, it is quite possible that a unit half the size or even one-fourth the size will be entirely satisfactory.

After calculating a charge, the charging gang is instructed how much of each material wanted in the charge, but if your instructions are not executed as accurately as you have calculated the charge, then your charging gang has more to do with the chemistry of the iron produced than you have had in calculating it. Does your charging gang have a responsible leader who understands the important job this gang is doing and who does his job conscientiously? The author finds a responsibe leader rather infrequently. How much attention is given to accurate weighing or ascertaining accurate tare weights for wheelbarrows, trucks, charging buckets or other equipment that is on the scale when charge materials are weighed?

That is only a kindergarten problem around the foundry, but the chances are that many of you will be quite disturbed if you really check-up on the accuracy of weighing your cupola charge materials. There is a great deal of the human element problem in accurate weighing. There is a good possibility that scales are not adjusted or that correct tare weights are not used for wheelbarrows, etc.

When materials are weighed for the cupola, the most important material to weigh is the coke. Forking coke into the cupola is decidedly poor practice and efforts to measure it volumetrically are also insufficient. In many cases, a recording tape can be used with the scale which will make a record of each component in the charge. A per-

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manent record of weights is an incentive to the human element to do a good job and may be passed on to the accounting department as a record of materials consumed. In lieu of a means of recording the weights of charge materials, it would be desirable to develop a responsible leader in the charging gang.

The author has some preferences in the size of materials used, in that the maximum linear dimension of materials in the iron charge should not be more than 30 per cent of the cupola diameter and that the coke size should be about one-twelfth the cupola diameter. By maximum linear dimension, I would like to say that this dimension for a cube 12 x 12 x 12 inches is a figure of 20¾ inches and not 12 inches, since the greatest dimension is a diagonal through the center from opposite corners.

A coke size one-twelfth the cupola diameter means a 3 x 3 x 3 coke for a 36 inch cupola or a 4 x 4 x 4 coke for a 48-inch cupola. A 3 x 3 x 3 coke is a piece of 27 cubic inches and the 4 x 4 x 4 coke is a piece of 64 cubic inches. Those pieces on a scale, probably would weigh less than 10 and 24 ounces, respectively. In the author's opinion, no cupola is large enough to handle coke particles weighing more than 1½ pounds and small cupolas might be served best with pieces of 4 or 5 ounces. To see what you have go out to your foundry coke pile and take an assortment over to the scale that will weigh in ounces and weigh the pieces separately.

What will you find when you do this in your foundries? You will find pieces that weigh 5, 10, 15 and 20 pounds each. What can you do about it? The chances are just fair that your coke supplier is making two or three sizes of coke for the foundry trade and he may be able to ship you a smaller size. It is also possible that he is using a foundry grade of coke, in three of four different sizes, to supply his domestic market and that one or two of these sizes would be quite satisfactory for your cupola.

If you wish you may take your present size coke and break it up with a small hammer to experiment with smaller sizes. If you receive coke from several sources, it is desirable to keep the different sources separated as every coke has its own individual characteristics that play a part in the cupola process.

Use Small Limestone

What about the cupola flux? Generally, this is limestone and frequently it is 2 inches in size and larger. Smaller sizes such as 1 inch and even ½ inch for small cupolas would be an improvement over 2 inches and above sizes. The amount of limestone to use depends on the type of materials in the charge, the method of slagging and the length of the day's melt. An average limestone charge would be 60 pounds per ton of metal.

What about taking a look at the cupola before we put the materials to use? You probably are giving considerable thought to the tuyeres. Most of the other details which have a bearing on cupola operation are more important than the area or design of the tuyeres. If any feature of cupola operation is mysterious to you, it probably has much less bearing on good or bad cupola operation than those factors which have a very practical appeal to your common sense.

The tuyere area is generally one-fourth to one-fifth the cupola area. The "effective" area of the cupola under operating conditions is only one-sixty-sixth of the cupola area so tuyere area is usually 15 or 20 times the limiting area of the cupola. If you wish to assure yourself on the importance of tuyere area, you could take the cupola some day when it is not operating and from the inside plug the tuyeres with wood wedges or with a wood

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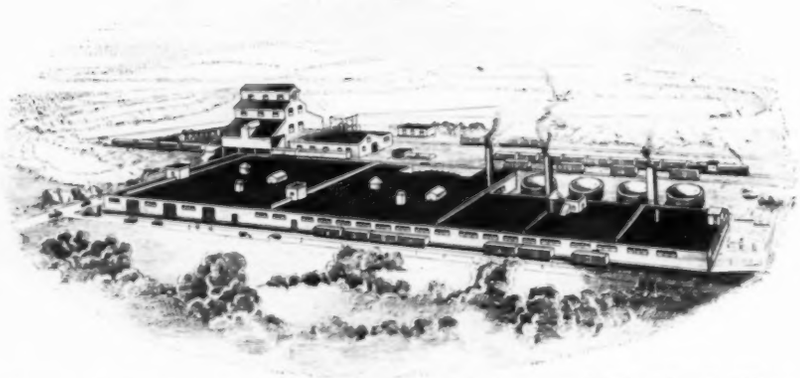

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form cut out to fill in the tuyere space, then turn the blower on and see what happens. What will happen is that the insignificant void spaces left in between the wood wedges is still sufficient to permit all the air required to flow into the cupola. What is a tuyere anyway? It is a doorway between wind box and inside of cupola.

The cupola diameter should be restricted at the level of the top of the tuyeres, and that restriction be maintained for a 16-inch elevation then the refractories tapered back to the normal diameter. The restriction should be 3 to 6 inches in diameter in proportion to the cupola diameter.

If rear slagging is used, the slag hole should be about 6 inches below the tuyeres and not right at the tuyeres. The slag hole should be 1½ inches in diameter, and it is essential that the size and elevation of the slag hole be maintained throughout a heat and from day to day. Air losses through a burned out slag hole may be very appreciable.

Tap in Three Ways

There are three methods of tapping a cupola: (1) the oldest method is intermittent botting and tapping, (2) the automotive method of calibrated tap holes with continuous flow of metal through the breast hole and continuous flow of slag through the slag hole, and (3) the front slagging spout through which both metal and slag flow.

More use the oldest method, that of intermittent tapping and botting so while checking the cupola, we should be interested very much in the diameter of the tap hole and in the construction of the breast. It is usually better to use a breast hole of 1 inch to 1⅜ inches diameter than to use one less than 1-inch diameter because metal is transferred from the well to its position in the ladle in the least possible time. There are other details concerned with the construction of the breast and the other two methods of tapping which will be passed by for the moment.

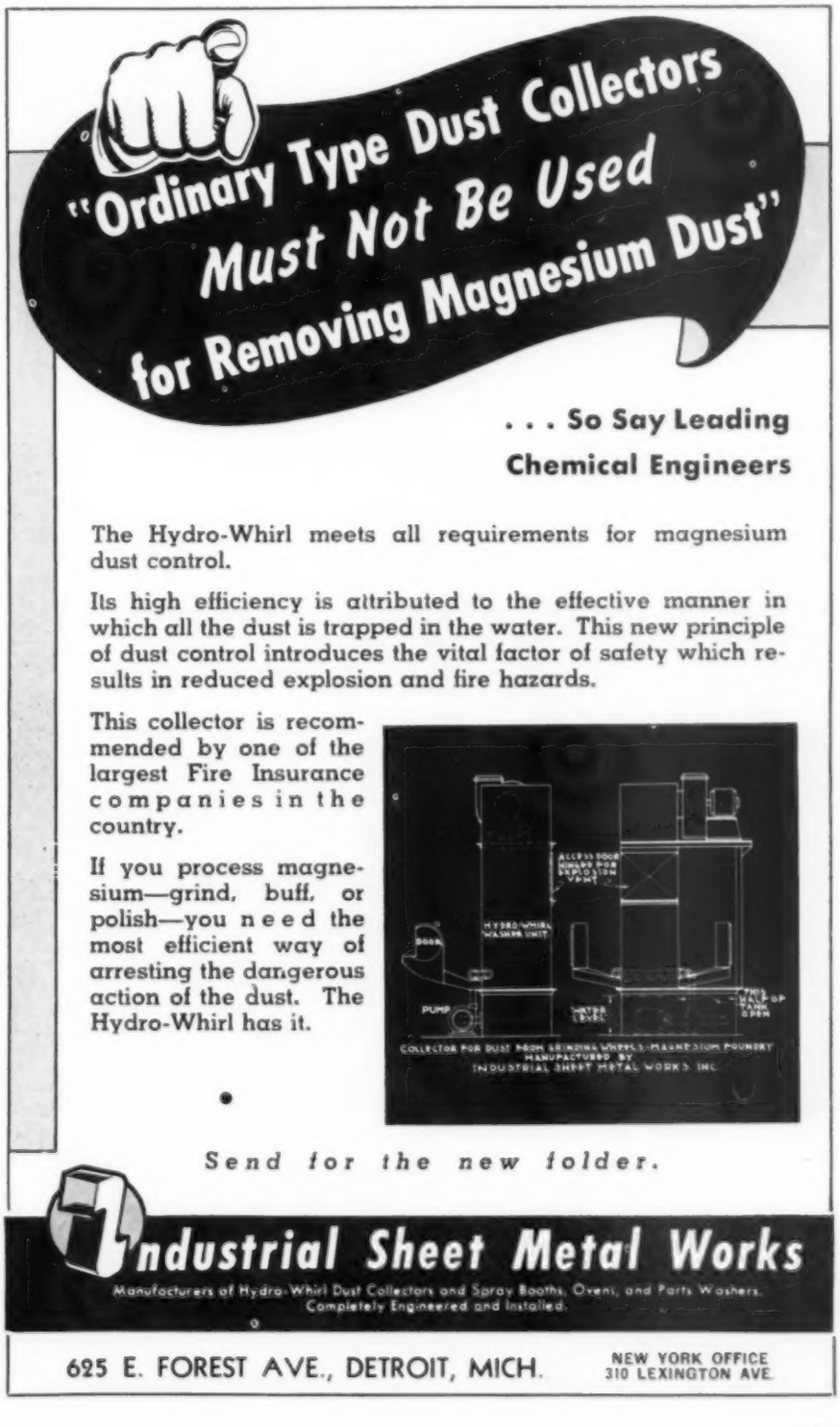
The cupola spout usually is not a neat looking affair and is designed to handle metal between breast hole and ladle with the least exposure to cooling air currents. It probably provides for a wide, thin stream of metal whereas a narrow, deep stream would be better.

Before placing a cupola in operation the bed height should be determined. Also check the height of the cupola from the base plate to the charging door sill. That latter dimension should be close to 18 feet, but is occasionally a great deal less or a bit more. Mechanical charging needs more height than hand charging to accommodate the mechanics of the cupola charger apparatus.

Other features to be examined include blast piping, blast gates, bleeder lines, blower installation, peep hole and manhole cover on cupola wind box. It is desirable to check the base plate of the cupola, slag hole frame and taphole frame for cracks and potential sources of air loss. Check your pressure gage before the cupola goes into service to find out if the zero point is actually at zero. If that instrument is not available, have one installed. Look the blower over to get accurate information on its delivery characteristics if possible. If you can't, then check it as carefully as you can and make an estimate of its performance.

When the bottom sand is put in it should be screened free of metallic materials such as nails, etc., and it also should be free of clay balls. It should be prepared with as much care as a good molding sand. The depth on a small cupola should be 4 inches and on a large cupola from 6 to 10 inches depending on duration of melt. The bed coke can be lighted by using wood or by channeling coke and igniting the coke with an oil or gas torch, etc.

As the tuyere level is some dis-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tance above the sand bottom you can see readily that it is more difficult to get high temperatures in the bed coke below the tuyere level than above it with natural draft pulling through the tuyeres and air moving upwards in the cupola. It is necessary to get the bottom sand and the refractories in the well zone hot if first iron is to be hot enough to pour.

If the breast is not constructed until after the bed coke has burned through, or if two or three holes around the periphery of the cupola at a level of the sand bottom are provided, then a source of air is provided near the bottom which will help get high temperatures here and hot metal later. In small cupolas, a pipe which has been drilled full of small holes, may be inserted through the breast hole and a supply of air delivered through this pipe. In small cupolas, a temporary grate may be constructed through the tuyeres with 2 x 4's on which the wood fire may be built and the first coke ignited before the 2 x 4's are consumed.

It is essential that a means of getting a high temperature in the lowest part of the cupola be achieved and then it is essential that the bed be lighted sufficiently ahead of the time that the blast goes on to permit the refractories to absorb all possible heat. Refractories are insulating materials which retard heat flow, so it takes time to drive heat into them. It isn't sufficient to light up an hour or an hour and a half before the wind goes on. Light up as early as possible. If necessary rearrange the schedule of the men concerned with getting the cupola ready for the day's run to provide more soaking time for the cupola refractories to absorb heat from the bed coke. It is desirable to do so. Any additional time above 1 or 1½ hours up to as much as 5 or 6 hours would be an improvement.

When the bed coke is put in, it is preferable to put in about one-fourth of the total bed rather than the usual practice of one-half, and allow this to burn through to a white heat. Then do the same thing with the second quarter, followed by the third quarter and then the last quarter. The desired end point is a white hot bed of the desired height with no green coke added to adjust for proper height.

Place Limestone on Bed

At one time, it was recommended that limestone be used on the second or third charge, but if you have observed melting operations through the peep hole covers or checked the slagging operation of your cupola, you know that the slagging operations lag behind the melting operations by ½ to 1 hour. It would be desirable to have slagging operations synchronized with melting or even slightly preceding melting.

Before any iron is charged place on top of the bed, three or four times as much limestone as is used on each charge, and it is preferable to add some of that limestone to the bed coke after the first three-quarters of the bed coke is in rather than to delay this addition until all of the bed coke is in or until the bed coke and two or three iron charges are in.

In the author's opinion, slag insulates metal in the well zone of the cupola from the cooling air currents at the tuyeres resulting in an improved temperature during the early part of the run, and he also believes it acts as a filter separating non-metallic materials from metal, resulting in a cleaner iron going to the ladle. He believes that in the 2.5 per cent silicon irons that early analytical results showing higher silicons than subsequent analyses are due to silica contaminations due to insufficient slagging during the early period of the melting.

After the coke bed height is established at the desired level, charge

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with the least possible delay and put the blast on immediately. When the blast goes on, check the time of first iron at the tuyeres by a stop watch. It should be 3½ to 4 minutes. Metal should be accumulating at the breast hole in 8 minutes, and you should be able to take a tap in not over 12 minutes. From then on the frequency of tapping should be timed; (1) To determine the uniformity of time interval between tapping, (2) to determine time the hole is botted up, and (3) to determine time the metal is flowing through the breast hole.

Frequency between taps, including both the time the breast hole is botted up and the time the stream is running should not be more than 4 minutes or (15 taps per hour). The frequency might be as much as every 90 seconds, that is 40 taps per hour. If the tapping frequency is 10 to 20 minutes, that is 6 to 3 taps per hour, as is the case in some foundries, the metal is losing temperature and soaking up carbon so that it is more difficult to maintain the highest quality standard attainable in cupola performance.

Check on Various Items

It always is advisable to check the cupola pressure and operations at 16 ounces or more are preferable to operations at 16 ounces or less. Check up on air losses with the air circuit under pressure, and on the metal temperature with a pyrometer. Check up on the time the slag hole is opened.

Is the size of the cupola charge in good relationship to the amount of metal taken away per ladle if no reservoir ladle is used? Is the amount of metal in the ladle a fraction of the weight of the charge or is it two or three times as much as the charge? It is a good thing to weigh metal going into the ladles or to know the amount of metal being handled by calibrating the ladle.

In the author's opinion, carbon is an all important element in cast iron. An ability to attain desired carbon levels repeatedly is a mark of capable cupola operation particularly when the desired carbon level is below 3.0 per cent. Metal and fuel are in intimate contact from the time of charging to the time of tapping. When the carbon in the charge is less than 3.5 per cent then it is probable that some of the carbon in the fuel will be dissolved by the iron during the melting process. The carbon content of the cupola charge, industry wide, may be as low as 0.75 per cent or less. Under some types of operation the carbon dissolved by metal while in the cupola may be as much as 60 pounds or more per ton of iron.

Some cokes dissolve in iron more readily than others, so if you are producing a high carbon type of cast iron, it would be desirable to use a coke that dissolves readily, and if you are producing an iron of low carbon content, you would want to use a coke that did not dissolve readily.

Other factors which have a bearing on the amount of carbon dissolved in the cupola process are: (1) Chemistry of the iron in that the higher the silicon and the higher the phosphorus content, the lower the carbon will be or the higher the chromium, the higher the carbon will be, (2) the amount of fuel used, (3) the carbon content of the charge, (4) the metal temperatures attained, (5) the surface area of the fuel, (6) the melting rate of the cupola, and (7) the method of tapping the cupola.

This is the first of a series of two articles on cupola practice taken from lectures presented by the author before the Central New York Chapter at Syracuse and Elmira, N. Y. The second article will appear in an early issue.

THE EDITORS.

Instalment Selling — Pros and Cons is the title of pamphlet No. 61 published by Public Affairs Committee Inc., 30 Rockefeller Plaza, New York. Copies of the pamphlet may be secured for 10 cents each.

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GATING AND MOLDING MALLEABLE

(*Continued from page 70*)

would not pack between patterns and many other contributing factors resulted in scrap which the molder could not avoid.

In those days, molding ability was a requirement—today in production shops it is not. We take a man today, teach him to pour iron, give him a pattern properly designed, sand prepared for his particular job, other tools necessary and you have a molder. If you should ask 95 per cent of our molders for a slick, they wouldn't have one. Possibly about 10 per cent would know what you were talking about. If you would ask them for a blow pipe they would say they smoke cigarettes.

The previously mentioned circumstances are not true in a jobbing shop where a large number of loose wood and metal patterns must be contended with. Here is where we need real molders. However, in the case of ungated patterns, if loose bobs are made up and numbered with the patterns, locations marked on the patterns where to set the bob, etc., plenty of shrinkage trouble would be avoided. That procedure would eliminate the extra cost of grinding an ill cut gate, which might be twice the size necessary to eliminate the shrink or broken too far away from the pattern.

Pouring cold iron into molds to avoid shrinkage has been giving the foundryman considerable more trouble than the shrinkage. Cold iron causes gas pockets, blow holes mostly under the surface, cold shots, misruns, washing and possibly other defects not mentioned. The author's contention is that if the pattern is gated properly to eliminate shrinkage the iron can be poured hot and those defects avoided.

Dendrites Hard To See

Dendritic structures have given all of us headaches. Some dendritic structures are almost impossible to see in hard iron when broken unless examined very closely. The planes of weakness have no discoloration as a common shrink would have. Those planes usually will be found right in front of the gate, running to the center of the casting and in many cases there will be planes from the other side of the gating running into the center, meeting in the form of a hub. Castings of this nature are very weak and easy to break after annealing. Dendrites are more hazardous than shrinks because of failure to see or distinguish them.

The accompanying illustrations show castings on which corrective measures were applied to eliminate shrinkage and cracking. Fig. 1 is an automotive casting. When this pattern was received a sample was made and shrinkage was found across the top just above the four cored holes where the rise leaves the flat. The rib, at the point where the casting is gated, was but ¼-inch in section. This was built up to ⅝-inch, substantial fillets were added in the corners and all shrinkage was eliminated. Fig. 4 is the same casting showing gates, the rib sections which were built up, and the added fillets.

Fig. 6 shows a 15-pound casting from which it was difficult to remove the shrinkage until the rib was built up from ¼-inch to 1-inch, with heavy fillets added, leading to a heavy boss on the opposite side. Fig. 7 shows another view of Fig. 6 giving an idea of the size of the gate and the built up rib leading from the gate.

Fig. 11 shows a wheel fork casting weighing 25 pounds. It is used on a grading machine and must

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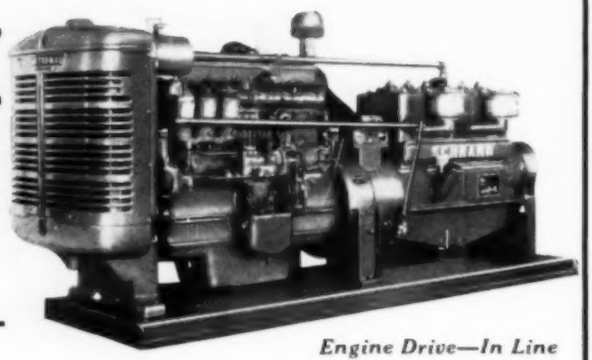

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withstand severe punishment. This illustration also shows a view of the heavy sections to be fed. Fig. 2 is the same casting and shows the ⅜-inch rib built up to ¾-inch for gating and feeding into heavy section across to the bend in the arm opposite the gate. That was very effective in removing all traces of shrinkage. Without the fillet or gating boss it was impossible to remove the shrink.

Fig. 5 is another automotive casting showing a large fillet under the flange leading to the heavy boss in the central section of the casting; also a very heavy fillet leading to the two heavy end bosses. One gate here fed all three bosses. Before adding the cross fillet it was necessary to use two bobs. Without the fillet to the central boss it was impossible to remove the shrink because the metal would not feed through the light section to the boss.

Fillet Prevents Shrinkage

Fig. 10 is an anchor base. We have no side or top view. The side view would show a small hub in the cope. The view shown is the drag. The hub, where it connects to the base, was completely shrunk off. A ram-up core in the cope and the construction of the drag made a chill almost impossible. The large fillet leading to the hub eliminated the shrinkage.

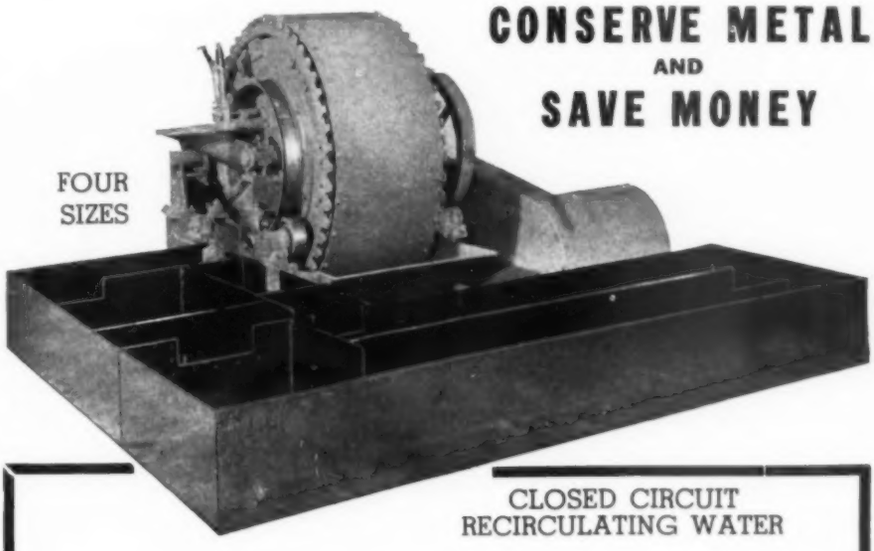
Fig. 8 shows a foot pedal which has given the industry considerable trouble in attempting to remove shrinks and cracks. The section originally was lightened out the complete length of the casting. You will note we have filled in at both ends and at the bend, the three places where shrinkage occurred. A feeder of sufficient size to correct the shrinkage was placed at these spots just as close to the point intended to feed out as possible.

The runner gate is made with practically the same contour as the casting since a straight bar used will not give with the casting and would cause considerable cracking. In many cases we use a tunnel core over or under some part of the casting to get a live feeder. We do this when there isn't flask room to go around. Care must be exercised in knocking off gates as this is often a contributing factor in cracked castings.

Fig. 12 shows an automotive spring shackle. It will be noted that the inside of the rib has been increased from 3/16-inch metal to 7/16-inch metal by a large fillet. Also a cross fillet has been added from the gate to the opposite arm which feeds through to this arm. One gate and one feeder bob is used. Without the fillets it was necessary to use two bobs, one on each uncored boss. The fillets eliminated one extra feeder and one gate, besides making a sounder, stronger casting. The gate is in a much better spot to grind than on the round bosses.

Fig. 3 shows a casting in which it was impossible to remove the shrinkage without the fillet because the metal would not feed through the thin section to the hub. Chills around the boss only drove the shrink down along the inside of the arm, or channel.

Fig. 9 is a view of a 20-inch valve wheel weighing 30 pounds. It will be noted that a 1-inch almost square fillet leads into the hub, also that a section of the rim is left out. The fillet eliminates the shrink around the hub. The iron is chilled as it moves out through the thinner arm sections, which helps to remove shrinkage in the heavy rim. The cut in the rim is to free it and let it open up. The cut opens up about ¾-inch. Without the cut, we could save only a very small percentage because of the cracks of a very severe nature. They would fly completely apart. Hot potting would not cure it. We make malleable plugs and braze them into the open rim section.



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There is no percentage ratio set up that we know of to determine the proper size of a feeder bob or a gate opening. Practical experience is the best teacher. Even then, in many instances, it is necessary to make samples to determine the proper sizes. In conclusion we wish to stress that the failure of a malleable casting in most cases is not due to improper analysis or physical properties. Failure can usually be traced to an unsound condition which could have been eliminated by proper design and gating.

This article is from a paper presented by the author at the regional foundry conference held at Purdue University, Lafayette, Ind., on Oct. 17 and 18 under the sponsorship of the Engineering Extension division of the university and the Central Indiana, Michiana and Chicago Chapters of the A.F.A.

THE EDITORS.

E. F. Houghton & Co., Philadelphia, held open house for stockholders and customers Dec. 11, to mark completion of a new office building. Structure is a 3-story unit with glass-block construction and air conditioning. Facilities for manufacture of cutting, quenching and lubricating oils, packings, heat treating, metal working and other products also have been increased recently.

Magnesium Control Is Complete

OPM has ordered complete control of magnesium and magnesium products under a program designed to route supplies into needed defense operations. Holders of all forms of magnesium and its products, no matter by whom held, are to report their magnesium holdings to OPM before Nov. 30 to be held for sale to a producer or an approved smelter so the metal may become available for defense uses.

Advisory Committee For Farm Machinery

The Bureau of Clearance of Defense Industry Advisory Committees of the OPM recently announced the formation of the Farm Machinery and Equipment Industry Advisory Committee. Committee members are: George C. Stoddard, secretary, DeLaval Separator Co., New York; Wade Newbegin, president, R. M. Wade & Co., Portland, Oreg.; H. Dempster, president, Dempster Mill Mfg. Co., Beatrice, Nebr.; Z. W. Craine, president, Craine, Inc., Norwich, N. Y.; P. E. Herschel, vice president, R. Herschel Mfg. Co., Peoria, Ill.; W. J. Fisher, vice president and general manager, A. B. Farquhar Co. Ltd., York, Pa.; George A. Kelly, president, G. A. Kelly Plow Co., Longview, Tex.; J. L. McCaffrey, vice president, International Harvester Co., Chicago; Roger M. Kyes, vice president, Ferguson Sherman Mfg. Corp., Dearborn, Mich.; J. P. Wheeler, general manager, David Bradley Mfg. Co., Bradley, Ill.; J. C. Myers, president, F. E. Myers & Bro. Co., Ashland, O.; D. Ray Hall, president, Gravely Motor Plow & Cultivator Co., Dunbar, W. Va.; Lee Madden, vice president, Stover Mfg. & Engine Co., Freeport, Ill.; Colin Brown, president, E. C. Brown Co., Rochester, N. Y.; S. Mahon, vice president, James Mfg. Co., Fort Atkinson, Wis.; C. D. Wiman, president, Deere & Co., Moline, Ill.; King McCord, vice president, Oliver Farm Equipment Co., Chicago; Theodore Johnson, secretary, J. I. Case Co., Racine, Wis.; W. A. Roberts, general manager, Tractor Division, Allis-Chalmers Mfg. Co., Milwaukee; W. C. MacFarlane, president, Minneapolis-Moline Power Implement Co., Minneapolis; W. H. Roberts Jr., sales manager, S. L. Allen & Co. Inc., Philadelphia; L. J. Brower, treasurer, Brower Mfg. Co., Quincy, Ill.

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DEVELOPMENTS IN CAST METALS

(*Continued from page* 69)

thus avoid the use of more expensive materials, the inherent values of which are difficult to appraise.

There has been a definite improvement in pig iron in the last few years through the introduction of the smaller pig, a closer classification according to silicon content, and a greater uniformity in analysis of each carload lot made possible by the use of large mixers at the blast furnace. Some pig iron producers are giving serious thought to the production of low carbon pig iron for the foundry trade.

Such pig irons have been sold abroad for some time and appear now to be in demand in some American foundries to replace steel and iron scrap in cupola charges. Those improvements in pig iron and better proportioning of the cupola charge tend toward better control of the analysis of the cast iron.

Use More Steel Scrap

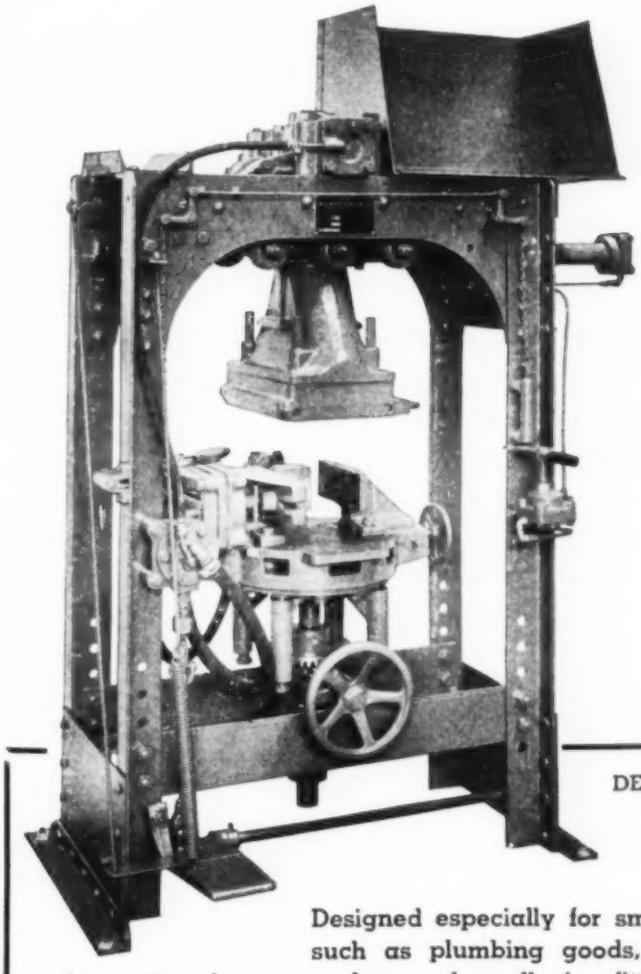
One trend in gray iron foundry practice has been the use of more steel and scrap in cupola charges. One reason for this is to make it possible to obtain lower carbon contents and to strengthen the irons. Changes in the cost and in the availability of scrap metals have caused some foundries to reverse this tendency and to go back to greater proportions of pig iron. The present situation on available materials vitiates all normal trends. With the present scarcity of pig iron and other regular cupola scrap materials, the foundryman no longer can follow tradition, even if he wanted to, but must make the best of available materials—materials he would not have considered a few months previously.

Since the quality of cast iron is affected greatly by the manner of melting, close attention to cupola operation, as practiced in modern foundries, has resulted in vastly improved and more serviceable castings. Better control and regulation of the cupola has been made possible by the use of instruments and auxiliary equipment that not only measure and control what enters the cupola but also regulate the operations within the cupola so as to bring down iron of uniform composition and quality.

Outstanding developments in recent years, so far as cupola operation is concerned, are, in the author's opinion, air-weight or volume control, humidity control, and the hot blast. All three developments recognize that the cupola's primary function is to burn coke, and that for efficient melting and for effective utilization of the coke the quantity and the condition of the air are profoundly important. Several methods for measuring the quantity of air are employed and most cupolas producing a quality product now are equipped with some type of air measuring device. Besides effecting definite improvements in iron qualities, controlled combustion is a definite source of fuel economy.

A new control device which measures the relative amount of air entering the cupola and simultaneously records the carbon dioxide content of the effluent gases recently has been installed on several cupolas. The two measurements are coordinated properly into an automatic control device consisting of a differential pressure recorder and a carbon dioxide recorder that regulates the blast, compensating for changing conditions in the combustion zone and giving both uniform and efficient cupola operation.

Humidity control of air for the blast furnace has been found to increase output and to save coke. In these times when furnaces are being taxed to their utmost for in-



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creased tonnage, the possibility of obtaining more pig iron from existing furnaces by drying the blast is receiving immediate consideration by pig iron producers and the government. The factors, which make for coke savings and faster smelting in the blast furnace using dry air, apply equally well to yield coke savings and faster melting rates in cupolas operated with dry air.

Users of dry blast equipment on cupolas have also found that the customary fluctuations in operation with changes in weather conditions ceased and that the iron was much more uniform in composition and character from day to day. While there are few cupolas today equipped for humidity control of the blast, one could prophesy, without too great a risk, increasingly wider use of humidity control in cupola operation, especially where heavy tonnages of iron are melted.

Hot blast cupolas are being installed in some of the larger foundries to reduce the amount of coke per charge, to obtain hotter iron, to lower the cost of melting, and to increase the melting rate. Tied in with humidity and air weight control, heating of the blast makes for economies in melting large tonnages that outstrip those of any other conceivable change in cupola practice.

Control Molding Sand

Gray iron foundries are giving increased attention to the control of all properties of molding sands. Thought now is being given to the use of so-called all-purpose synthetic sand which serves a variety of castings and practices within a shop. Foundries of all sizes, doing all classes of molding work are finding the use of sand testing and control equipment both necessary and profitable.

Cores made from zircon sand have been remarkably successful when used in heavy metal sections where burning-in of silica sand cores creates a problem in cleaning. The zircon sand core is highly refractory and resistant to metal penetration and the outline of its shape is reproduced accurately in the casting. The use of zircon sand for small cores in heavy castings has frequently saved many hours of chipping and grinding.

Cement bonded sand is now coming into the picture not only in gray iron but in steel and nonferrous practices as well. The process, known as the Randupson process, uses silica sand, and occasionally fused alumina or zircon sand where burning-in prevails, bonded with ordinary portland cement and water. The sand is milled and, because of its setting characteristics, must be used within a few hours

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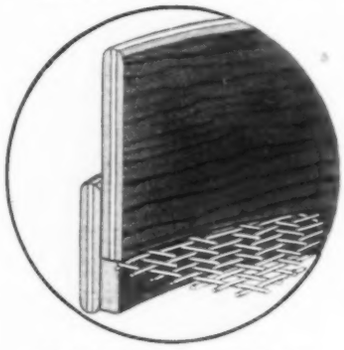

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after being prepared in the mixer.

The molding practice departs somewhat from usual practices as the material is rammed around patterns mounted in wooden boxes, and the molds are then set aside, after stripping off the boxes, to harden for from 24 to 72 hours. The surfaces may then be blackened if necessary. The various parts are fitted together and clamped without any surrounding flask parts. The molds have great mechanical strength and high permeability.

Outstanding developments, during recent years in gray iron have been in the metal itself. Through the control of carbon and silicon contents and of structure, unalloyed irons are being made consistently, in some foundries, with tensile strengths well over 40,000 pounds per square inch. The influence of carbon predominates over all other constituents. Many authorities have pointed out that the physical properties of cast iron depend upon the size and the distribution of the graphite flakes as well as upon their amount. Considerable headway has been made in utilizing the possibility of strengthening gray iron by lowering its carbon content either by using higher steel charges in the cupola or by better regulation of the cupola.

Improve Iron Quality

The gray iron industry also has available certain control practices, in minimizing the sharp fluctations in structures and properties which sometimes are encountered. These control practices generally improve the quality of the iron by providing a better arrangement of the graphite, which, in turn tends to give higher and more consistent physical properties and better resistance to growth, wear, and galling.

Introduction of alloying elements in cast iron has had a profound effect on the gray iron industry as a whole. It has helped to make the industry high-strength conscious, and, as a result, has led to a sound growth in the manufacture and the use of irons whose strengths far exceed what previously was the rule. The use of alloys in gray cast iron began about 1918, and since that time, nickel, chromium, molybdenum, copper, titanium, and vanadium have been used by the industry in increasing amounts.

Quite recently tellurium has been added to the list of alloying elements for gray cast iron. It is by far the most potent chill producing element known today. As little as two grams of tellurium along with two ounces of graphite, in one thousand pounds of metal is being employed with success by the chill car wheel manufacturers for controlling the depth of chill on treads of cast wheels. Even though extreme care is necessary in the use of tellurium, at the present time comparatively large quantities of chilled castings are being poured from iron to which tellurium has been added. A much improved chilled structure results from this addition.

There has been little change in the product of the malleable cast iron industry. It is true that the general level of strength and ductility has been raised from time to time, but this was accomplished mainly by lowering the carbon content without further altering the composition or the annealing practice. To a limited extent, the properties of fully malleablized iron have been changed by alloying agents.

A few foundries are producing short-cycle malleable; the quick anneal being accomplished by taking advantage of the accelerating effect of higher silicon contents and by using higher annealing temperatures. This calls for very careful supervision of the melting operation, a close check on raw materials, and good annealing furnaces and practice. Some short cycle malleable irons are fully malleablized in less than 15 hours. This may be compared with annealing cycles of 75 to 125 hours for regular malleable iron. Various so-called pearlitic mal-

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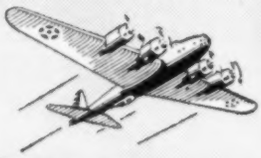

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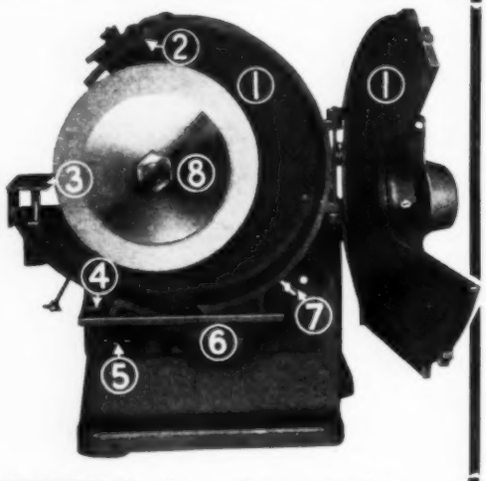

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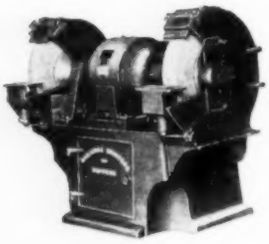

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leable irons are available, but they are being produced on a relatively small scale as yet. New combinations of properties are to be found in these irons.

The so-called Ford crankshaft type of low-carbon irons (though referred to as steels), in a sense, belong in a class with malleable iron. These are highly alloyed and are given a short heat-treatment to graphitize part of the carbon and to impart some ductility. An increased use of such material not only to supplement the regular and pearlitic malleable irons but also to develop new fields for the use of castings can be expected in the future.

Recent laboratory investigations have shown that white iron in the regular and quick malleable ranges of composition responds to annealing at a much faster rate after having been given a pretreatment for several hours in the neighborhood of 600 degrees Fahr. Annealing times have been decreased several fold by this practice. The irons become even more responsive if they are saturated with hydrogen before casting. These laboratory developments are too recent to have been applied commercially.

Trends Leave Their Mark

In discussing developments in cast steel, it is natural that trends of the time should leave their mark on the industry. The technical and industrial developments leading up to the present status of the low alloy, high yield strength, structural steels, for example, have had a profound effect in the steel casting industry as well. Low alloy, high strength cast steels have been developed in the past few years to provide combinations of properties in the normalized state to meet the following specifications of the American Association of Railways: Tensile, 90,000 pounds per square inch minimum; yield 60,000 pounds per square inch minimum; elongation 22 per cent minimum; and reduction of area 45 per cent minimum. The design for railroad equipment is towards lightening the weight of existing structures without any sacrifice of strength or without increasing the cost.

The three steels so far accepted by the railroads are the nickel-manganese, the manganese-vanadium, and the manganese-titanium types. These steels, after normalizing and a suitable draw, have about the same properties so that the choice between them depends on the practice and the experience of the individual foundries. The railroads have tested considerable tonnages of these steels in the form of side frames, bolsters, couplers, and other castings. Substantial savings in weight have been effected.

■

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Lightening of structures has introduced many problems in design and casting technique for the reduction in section has greatly increased the importance of casting defects and has placed a premium on more perfect castings. Some of the difficulties are being overcome successfully by better supervision of melting, pouring, molding, and sand technique; yet there is still much to be done toward perfecting the surface and eliminating the so-called stress raisers in the castings.

Those who are familiar with the field realize that castings have engineering values in their own right. In many uses of steel castings, as for instance where flow lines lead to failure, the lack of directional properties makes castings more enduring than forgings.

Cast Steel Centrifugally

The Ford Motor Co. now is casting steel gear blanks in centrifugal dies successfully. The method is in regular production for all Ford truck ring gear blanks and will be extended to full production of car ring gears and transmission cluster gears as quickly as the necessary equipment is completed. The advantages claimed for the gears made by the new method are greater strength, lighter weight, and faster production. The improved strength in the outer teeth, for example, is the direct result of the absence of all flow lines in the centrifugal castings, thus, the metal is equally strong in all directions and is not weakened by flow lines parallel to the lines of greatest stress, a condition which exists in some forgings.

It is being recognized now that steel castings also have an advantage over forgings on the score that the coarse grain structure of castings seems to give them inherently greater resistance to gradual distortion at high temperature, that is greater creep strength than forged material of the same composition. Work done both in the laboratory and the field has indicated this superiority for the cast steels.

A recent innovation is the continuous casting of steel as practiced at the Ford plant. This is being done by utilizing electric holding furnaces for the metal and conveyor rolls for bringing the molds direct to the pouring spouts. This system not only saves time but also produces more uniform castings because the metal for each casting is delivered at uniform temperature and is of uniform composition.

The metal in this process flows continuously at about 2800 degrees Fahr. into a pouring car which pours simultaneously two molds of 4 crankshafts each, the pouring temperature at the molds being 2700 to 2750 degrees Fahr. Continuous operations also are being used in

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producing the centrifugally cast gear blanks, flywheels, and transmission housings, and the whole foundry is being revised to go into volume production of cast steel tractor parts and other products.

Several steel foundries have been using, or are experimenting with, vertical type centrifugal casting machines for the production of castings weighing from a few ounces to as much as 2½ tons. The range of application of the vertical centrifugal casting machine, while not fully explored, is considerably wider than for the horizontal type of machine. Castings which are not cylindrical, or even symmetrical, can be made with the vertical type machine.

Molds may be made of green or dry sand, or of metal, though the latter must be heated and suitably vented to insure good castings. Sand molding, in this case, is not much different from normal sand practice except that the molds are rammed tighter and their permeability is correspondingly decreased. Higher metal yield, increased foundry capacity and decreased cleaning costs are claimed by some users of centrifugal casting equipment.

Study Steel Chemistry

Chemistry of steel making has been of intense interest to melters and to foundry metallurgists in recent years, and an understanding of the basic principles governing the chemistry of steel making has resulted in far better control of steel quality, less trouble in the foundry attributed to the metal, and a decrease in melting costs. The shortage of cast steel melting capacity resulting from the demands of the defense program and the need for immediate production, has caused the industry to look with favor on the bessemer converter.

This melting unit is about to regain lost prestige because of its inherent merit and the quality of the product it makes. In the last few years mixtures have been developed for introducing various alloying elements into cast steel and iron. These mixtures produce heat, allowing the various alloys to melt immediately and to disseminate in the metal without decreasing its temperature. They have made it possible to alloy steels and irons extensively in the ladle and to introduce alloys to the furnace without chilling the bath.

Demand of the defense program for large tonnages of cast armor plate for tanks and coastal defenses has opened up new applications for steel castings. But more important, it is teaching the foundries the possibilities of heat treatment, that is, the possibilities of water or oil quenching and drawing. The practice is by no means new; yet the industry has been slow to realize the possibilities of the process.

The experiences with armor plate should be valuable in the post-war period when plants, now engaged in defense work, return to civilian production and the industry must compete with other enormously expanded industries. Heat treatments, involving water- or air-quenching, open up several avenues of application which were previously closed to steel castings.

Sand reclamation, designed for both cleansing and washing the steel sand, is practiced in several foundries. Water is used to wash old and discarded sands to free them of silt, burnt and used clay, and soot. The sands then are dewatered with a vacuum filter and dried to a suitable moisture content by the application of heat. Such washed sands are equally as good as new sands and, with a moderate scale washing plant set up in the foundry, can be prepared at very low costs.

Bronze Is Heat Treated

In the non-ferrous field, from an alloy standpoint, the development of various types of silicon bronzes has been of major importance in the past few years. Several of these have made considerable progress in the last year in the engineering field; notable examples are the Everdur type and P.M.G. metal. The latter also contains, besides 1.2 to 3.2 per cent silicon, 0.5 to 1.2 per cent iron. Some silicon bronzes have been modified in composition to permit heat-treatment. Silicon markedly increases the fluidity of bronzes. In general, silicon bronzes have had a rather bad reputation with the foundrymen, owing to their tendency towards gas porosity. However, some of the modified silicon bronzes seem to be less susceptible to this difficulty.

Aluminum bronzes of the copper-aluminum-iron type are being used extensively for variable pitch, air blade screw bushings because of their toughness, wear resistance, and corrosion resistance. They are being cast centrifugally in permanent iron molds, the rapid chilling giving superior properties and microstructure.

Production of high strength bronzes, with tensile strengths in the neighborhood of 100,000 pounds per square inch, has increased rapidly. Centrifugal casting processes have been successful in the production of tubular or annular castings of nonferrous alloys. The advantages of centrifugal casting are increased economy in the production of special shapes and increased quality of the metal.

Most difficult problem in the nonferrous foundry is the control of porosity. The major causes for unsoundness are known but their control is not easy. Hydrogen is the

cause for most of the trouble in melting, the hydrogen entering the metal from moisture in the atmosphere or in the furnace and ladle refractories, from the products of combustion, from greasy, wet, or dirty charges, from hydrated oxides, and from other sources. Alloys containing high zinc contents are more immune to hydrogen unsoundness than are the low zinc or zinc-free alloys. Zinc vapors evolved from brasses and from zinc-bearing bronzes help to rid these metals of the gas.

In the melting of low zinc or zinc-free alloys, the practice of running the furnace under oxidizing conditions or of adding oxidizing reagents to the furnace or to the metal before casting has helped materially in the control of unsoundness. Many foundries prefer the latter method and are adding either black cupric oxide with the charge in the furnace or red cuprous oxide to the molten metal.

Heat treatment of some nonferrous alloys is now a common practice. Beryllium bronze depends on heat treatment for best results. The heat treatment of aluminum bronzes has been known for some time, but it is now being used to a much greater extent. Precipitation hardening treatments are being employed on the copper-chromium alloys.

A very rapid growth in the production of magnesium castings has taken place in recent years. One might expect this growth to accelerate tremendously in the post-war period when the pressure for magnesium production eases. The magnesium alloys are also strengthened and made more ductile by heat treatment.

Developments in the casting industry have enabled the producers of iron, steel, malleable, and nonferrous castings to meet the need for products suited to modern demands. Industries have found it necessary and profitable to keep ahead of their competitors, and the casting industry is no exception. Since the trend in numerous fields is now toward greater use of castings as engineering materials, it behooves the casting industry to continue its developments in order to maintain this trend.

Reference

(1) Schnee, V. H.—Gray Irons vs. Gray Iron. *Iron Age*, vol. 143, pages 19, 23, 48. April 20, 1939.

This article is from a paper presented by the author at the forty-fifth annual convention of the National Founders' Association held in New York on Nov. 13 and 14.

THE EDITORS.

Department of Labor and Industry, Commonwealth of Pennsylvania, has published safe practice bulletin No. 85 entitled, "Monochromatic X-ray Analysis of Fine Dusts for Free Silica."

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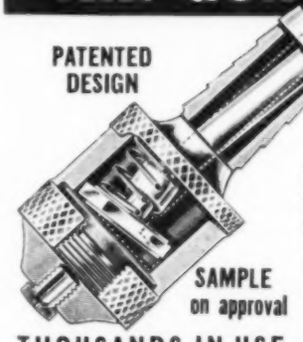

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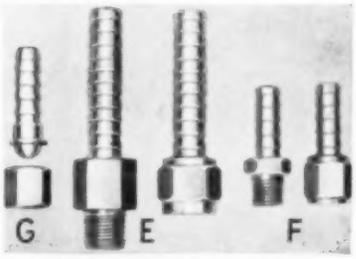

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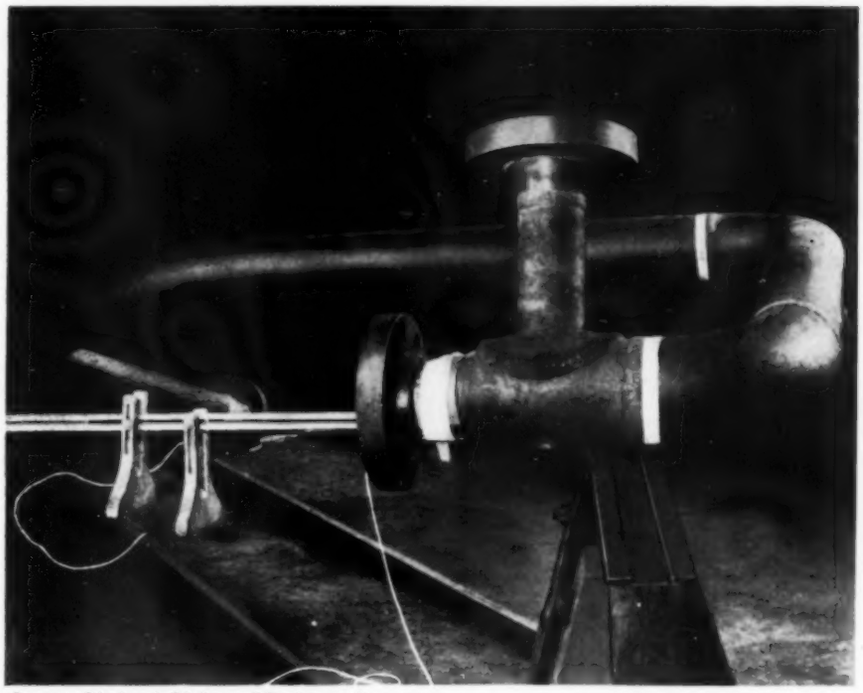

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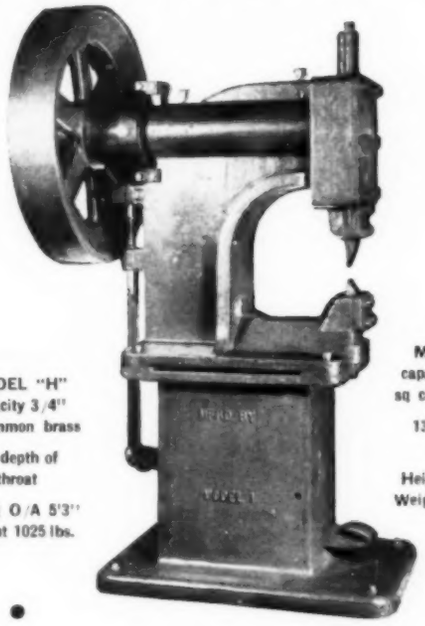

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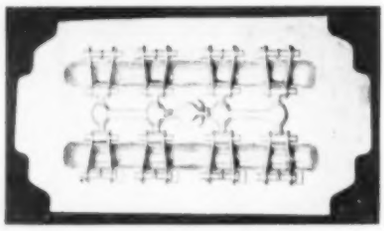

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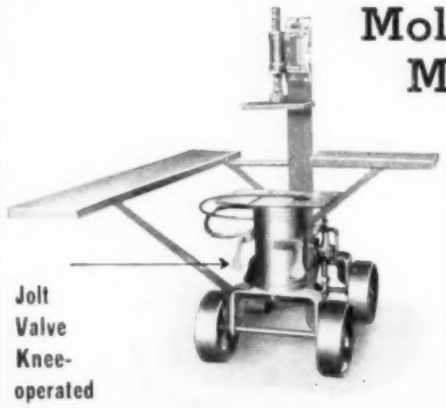

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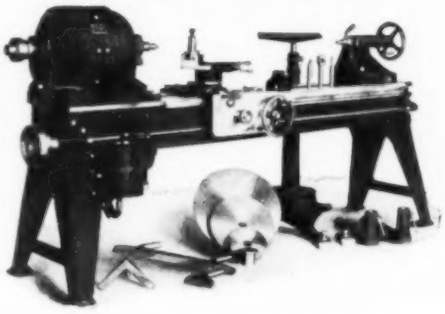

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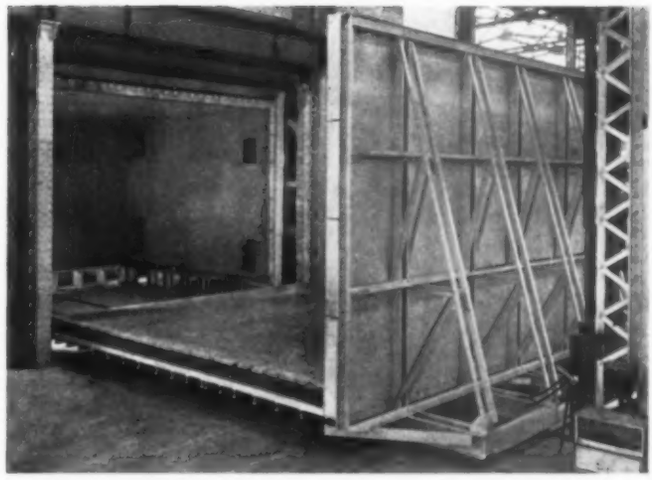

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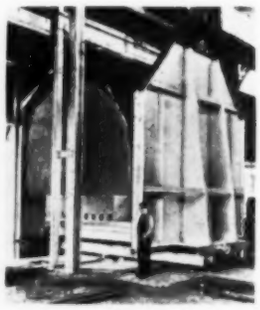

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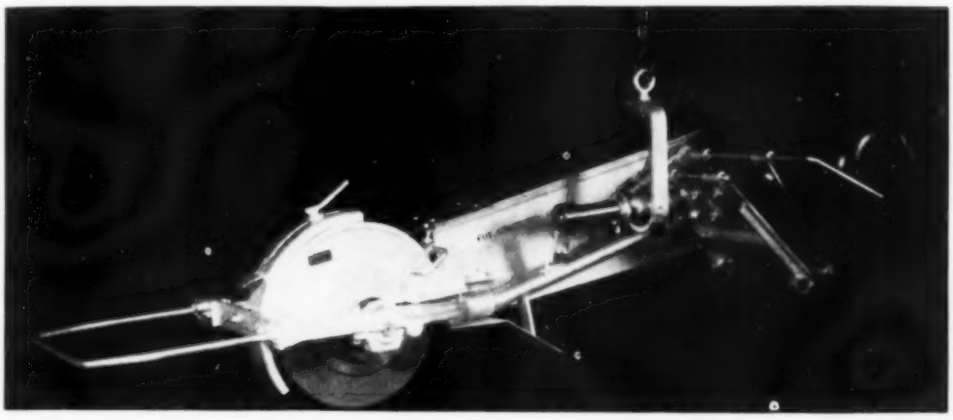

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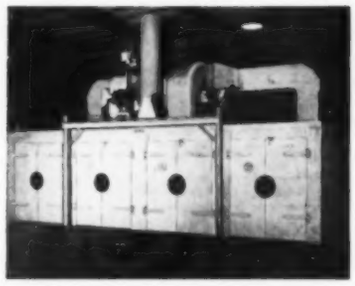

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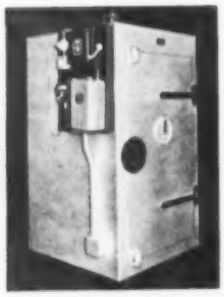

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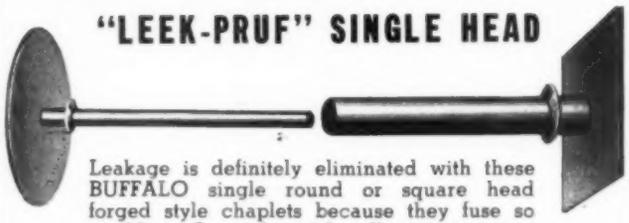

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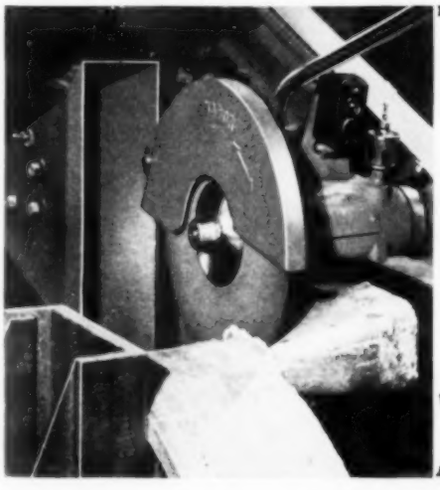

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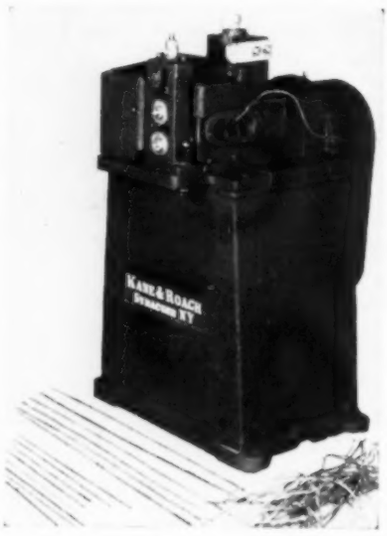

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JANUARY
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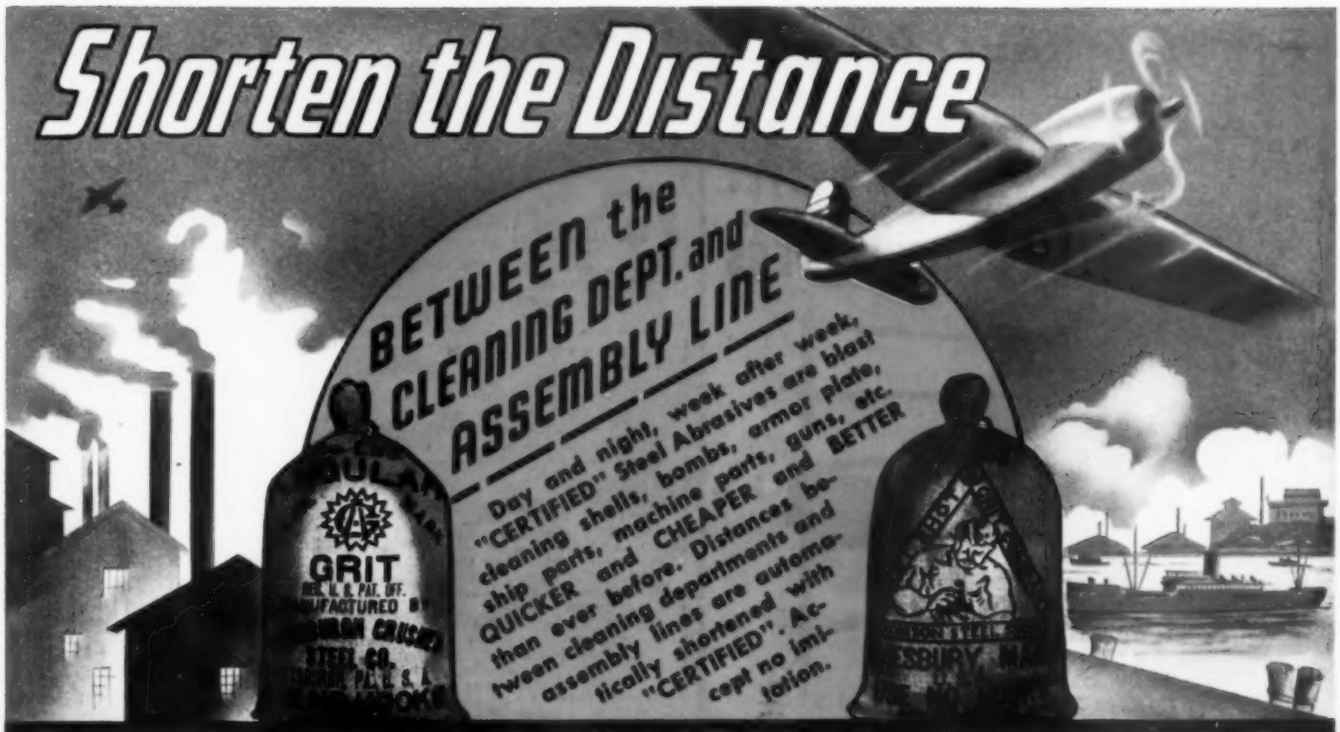
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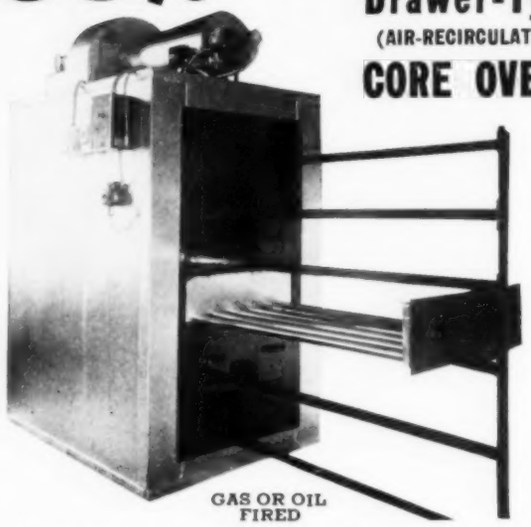

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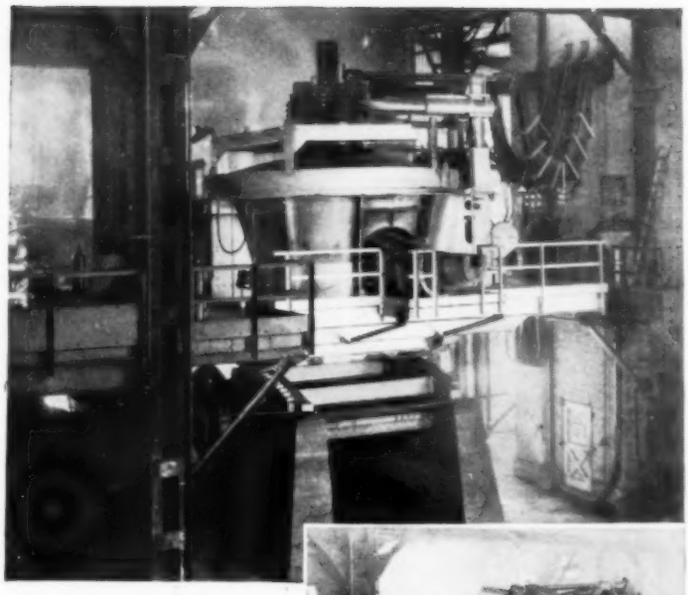

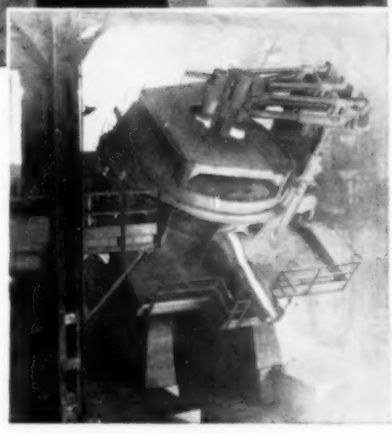

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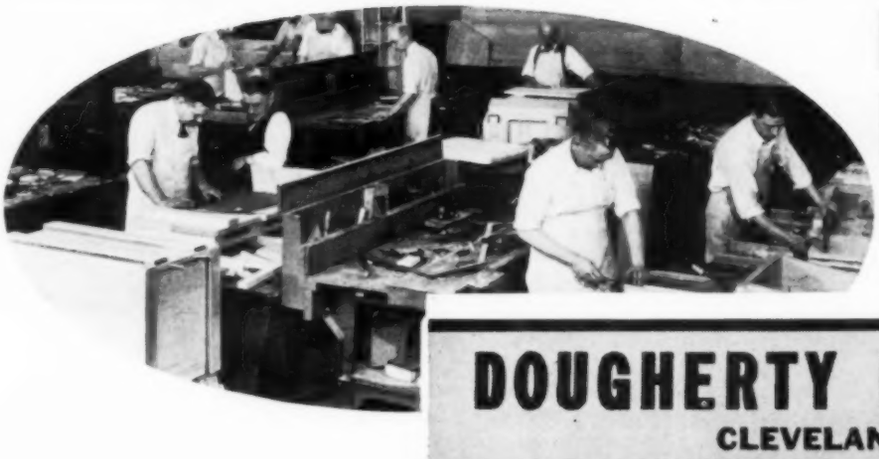

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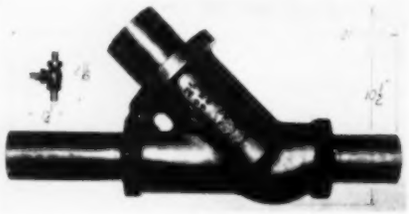

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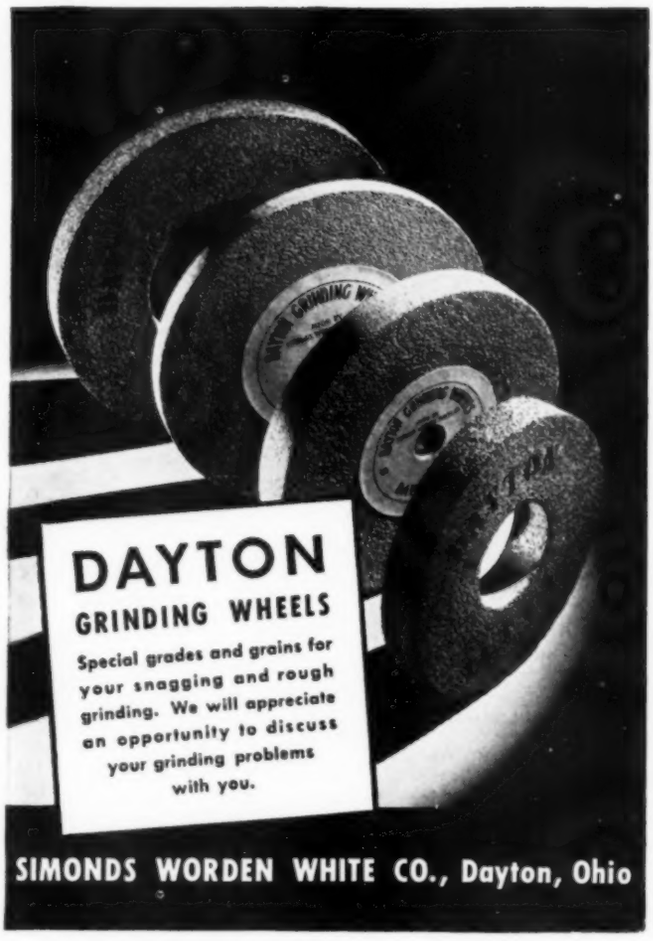

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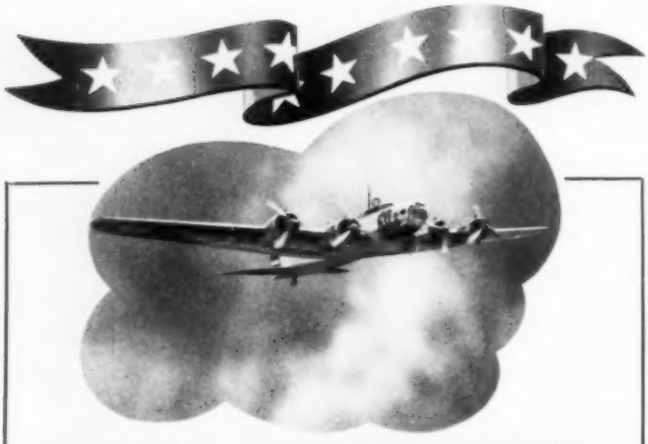

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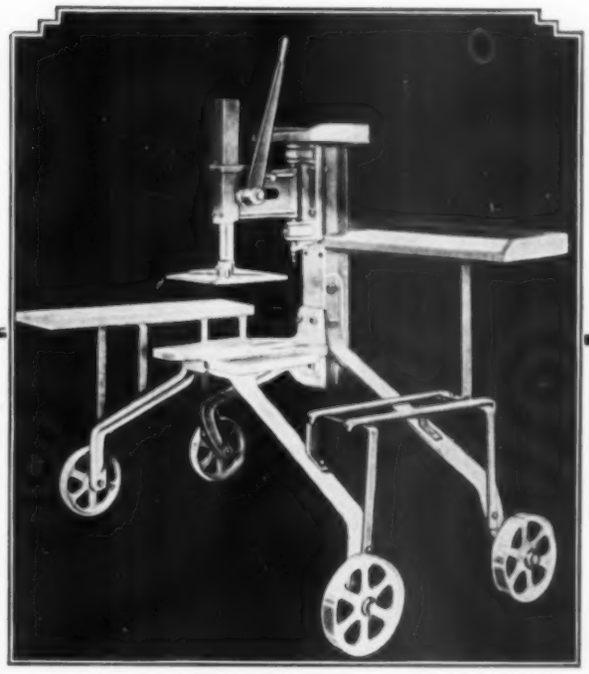

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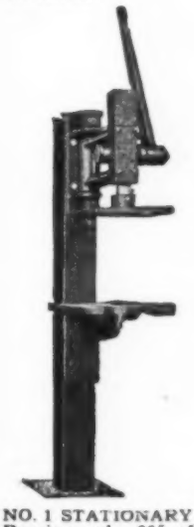

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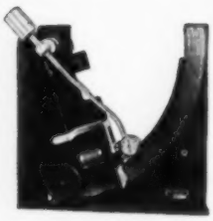
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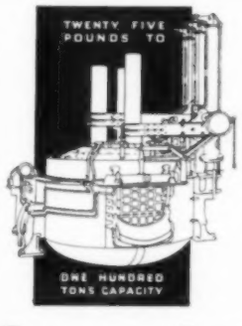

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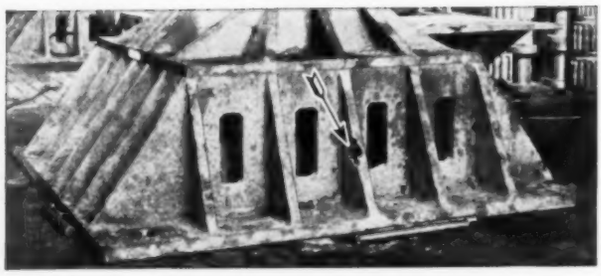

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Bethlehem Steel Co., Bethlehem, Pa.

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Dayton Oil Co., Dayton, O.

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International Molding Machine Co., 2608 W. 16th St., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.

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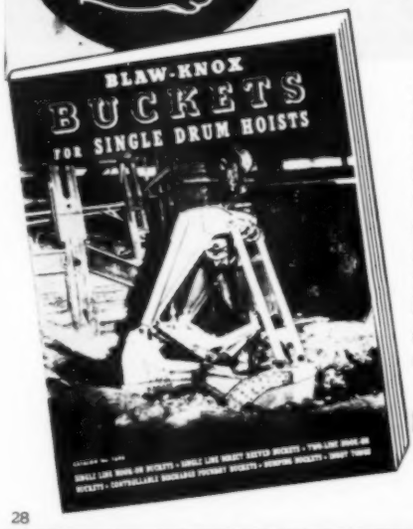

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Announcing . . . . . .

3000 tons Daily Capacity of

DOLOMITIC LIMESTONE of LOW SILICON content

MONTHLY ANALYSIS OF DOLESE LOW-SILICON DOLOMITE

	Iron	Phos.	Silicon	Alumina	Lime	Magnesia	Sulphur
Jan.	.20	.005	.35	.32	30.94	20.98	.028
Feb.	.24	.005	.52	.30	30.80	21.02	.037
Mar.	.22	.004	.39	.35	31.01	20.88	.027
Apr.	.20	.006	.37	.31	31.08	20.84	.038
May	.21	.004	.36	.30	30.87	20.95	.030
June	.24	.004	.35	.30	30.74	21.10	.030
July	.26	.006	.62	.32	30.71	21.06	.050
Aug.	.18	.005	.33	.20	30.58	21.31	.033
Sept.	.17	.005	.36	.26	30.91	20.88	.033
Oct.	.25	.007	.55	.22	30.94	20.68	.027
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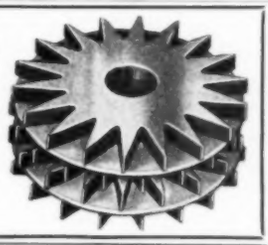

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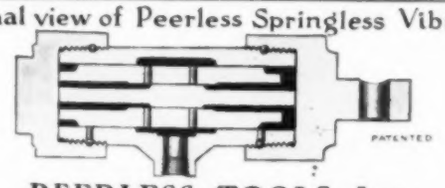

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Steel Foundry and Metallurgical Practice
Sand Mixes and Sand Control
Management Engineering
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Classified Advertising

Help Wanted

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Experienced in sheet metal, structural and steel plate work, also general machine shop and foundry work. In replying state complete background and salary expected. Address Box 585, The FOUNDRY, Cleveland.

WANTED

Young metallurgist having some experience in aluminum and magnesium for middle-west foundry working in aluminum and magnesium structural castings that must meet government specifications. Good opening for man willing to build with growing organization. Prefer one who knows practical foundry work. Address Box 589, The FOUNDRY, Cleveland.

ENGINEER WANTED

Experienced in sheet metal, structural and steel plate work, also general machine shop and foundry work. In replying state complete background and salary expected. Address Box 586, The FOUNDRY, Cleveland.

SALES ENGINEER

A well established concern is seeking a salesman, preferably around 40 years of age, thoroughly acquainted with purchasing and operating personnel of foundries in New York, Pennsylvania, and New England states. This is a wonderful opportunity for a man used to making good money. Give age, education, previous connections and all other details in first reply. Our salesmen have been advised of this advertisement. Address Box 576, The FOUNDRY, Cleveland.

MELTER WANTED

To operate acid electric furnace in midwest steel foundry producing plain carbon and low alloy steel. Attractive location, excellent working and living conditions. State age, experience, and expected salary. Address Box 569, The FOUNDRY, Cleveland.

FOUNDRY FOREMAN

Wanted for steel and alloy foundry in east specializing in stainless and heat resisting castings. Must be efficient manager, able to handle men, good knowledge of molding machines, qualified to produce a smooth casting surface and get results from bench and floor molders. Knowledge of furnace practice not necessary. Write giving age, experience in detail, references and salary expected. Address Box 582, The FOUNDRY, Cleveland.

SALES ENGINEER

Large, well established, prosperous company, one of the leaders in its field, is seeking a sales engineer. We prefer a young man, college graduate with technical training, preferably someone with foundry experience. A permanent connection with an attractive future for the right man. In reply give age, education, married or single and full details with respect to previous connections. Address Box 567, The FOUNDRY, Cleveland.

ASSISTANT FOUNDRY FOREMAN

For brass foundry located within a 10 mile radius of New York City, employing from 10 to 15 molders. Must be thoroughly experienced in all its branches. Give complete details as to qualifications and experience, also age and salary desired. Address Box 554, The FOUNDRY, Cleveland.

SALES REPRESENTATIVES

Established foundry supply house wishes to engage the service of additional sales representatives in New England and Ohio. Address Box 572, The FOUNDRY, Cleveland.

STEEL AND IRON JOBBING FOUNDRY IN THE NORTHWEST

Foreman wanted. Must be familiar with mixing steel facing sands, able to handle men, and produce the work. State age, experience, and salary expected in the first letter. Address Box 538, The FOUNDRY, Cleveland.

Help Wanted

REPRESENTATIVES WANTED

Well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items wishes to obtain additional representation by salesmen now calling on foundries regularly. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, THE FOUNDRY, Cleveland.

FOUNDRY FOREMAN

Wanted for western jobbing foundry employing about 50 men; iron, steel and bronze castings. State age, experience in detail and salary expected. Address Box 578, The FOUNDRY, Cleveland.

WANTED

Man with foundry experience to represent a molding sand corporation which now has large established trade in northern and middle Ohio. Give full particulars, age, experience, etc. Address Box 577, The FOUNDRY, Cleveland.

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Manufacturer of foundry facing, core oils and allied products wishes to engage the service of a research engineer. In reply give full details as to previous connections. Address Box 571, The FOUNDRY, Cleveland.

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Must be capable of producing quality work in light and heavy bronzes. Pressure work and high conductivity castings. Give references. Address Box 550, The FOUNDRY, Cleveland.

NEW ENGLAND SALESMAN

Core and mould wash—binders—chaplets—sand—shot and grit—foundry supplies. Salary or commission. Replies confidential. Address Box 552, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Wanted who is capable of running an electric steel foundry producing miscellaneous steel castings. Address Box 575, The FOUNDRY, Cleveland.

Positions Wanted

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Broad practical experience including steam valves, high pressure castings and general jobbing and production work. Address Box 581, The FOUNDRY, Cleveland.

ANODE—EXPERT

Foundrymen with practical experience in manufacturing of copper, brass and zinc-anodes (expolarized cast anodes) for plating process, desires a position. East preferred. Address Box 587, The FOUNDRY, Cleveland.

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Thoroughly experienced young steel foundry executive, 20 years' experience, now employed, desires a change. Can take full charge of miscellaneous or specialty steel foundry. Well acquainted with young executives in the industry who know how to get things done under present-day conditions. Can furnish complete or part organization for new or expanding plant. Location preferred Pacific Coast or Pacific Northwest. Address Box 584, The FOUNDRY, Cleveland.

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Position Wanted: 5c per word, minimum $1.50; Help Wanted: 6c per word, minimum $3.00. All other type advertisements: 10c per word, minimum $3.00. Copy should be received not later than 13th of month preceding date of issue. Address: The FOUNDRY, Penton Building, Cleveland.

Positions Wanted

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Having twenty four years as Foundry Superintendent, practical molder, technical education, desires position with foundry making high grade castings. Address Box 583, The FOUNDRY, Cleveland.

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Mature, profit-minded, dependable. Has successfully managed four companies—taken two out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales, finance and production. Extensive experience foundry, machinery, tool and related lines. Address Box 310, The FOUNDRY, Cleveland.

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Practical experience in all departments on light and medium gray iron and semisteel. Expert on cupola practice, mixing iron. Has handled such castings as machine tool, textile machinery and general jobbing. Good record. References furnished. Address Box 579, The FOUNDRY, Cleveland.

YOUNG FOUNDRYMAN

Desires position as foreman of jobbing brass foundry. Seventeen years' experience, six as foreman. Has initiative, ambition and can get results. Good rigger and handler of help. Does own alloying. Now employed but desires change due to certain chemicals that are detrimental to his health. Practical molder, technically trained. Address Box 539, The FOUNDRY, Cleveland.

FOUNDRY MANAGER

Ten years' experience with present employer, five years running large steel and brass foundry in heavy industry. Heat treating knowledge. Jobbing and design consultation experience. Technical graduate—under 40. Wishes to consider change which will offer greater opportunities for the future. Address Box 580, The FOUNDRY, Cleveland.

MELTING FOREMAN OR ASSISTANT TO SUPERINTENDENT IN GRAY IRON FOUNDRY

Experienced in heavy and light jobbing, dry sand and loam work, and motor castings. Can take charge of conveyors in motor foundry. Technical training on melting practice by McLain and Pennsylvania state college. Will go in any defense plant. American born. Address Box 588, The FOUNDRY, Cleveland.

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This thoroughly organized advertising service of 32 years recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details.

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Classified Advertising

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WANTED TO BUY

1300 to 1500 air compressor, or enough compressors to make 1500 ft. air. Also 150 KW 2300—250 V motor generator.

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We are in the market for used **sandslingers.** State type, year, condition and bottom price for immediate acceptance. Address Box 207, The FOUNDRY, Cleveland.

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Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

WANTED

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Gray iron foundry on main line of B. & M. R.R. with side track. Buildings in fair condition and sprinkled throughout. Plot area approximately 40,000 square feet.

GARDNER TRUST COMPANY
Gardner, Mass.

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FOUNDRY FOR SALE

A small foundry in Central Michigan, in automotive district. At present time filled to capacity with defense work. No labor trouble. Address Box 570, The FOUNDRY, Cleveland.

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BLOWERS—FANS—EXHAUSTERS

Roots-Connersville positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

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Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
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USED MOLDING MACHINES

9 Osborn No. 75-J Air Squeezer Jolt.
1 Osborn No. 76 Air Squeezer Jolt Stripper.
1 Osborn No. 404 Direct Draw Roll-over Jolt.
1 Osborn No. 98 Core Jolt Machine.
7 International 19" x 4½ Type CEF Turn-over and draw.
9 International 17" x 17 x 6 Type TPN Stripping.
3 International 14" x 6 Type RES Jolt Squeeze Roll-over draw.
3 International 44" x 48 Type BDF Turn-over and draw.
1 International 20" x 6 Type HJ Jar Ramming, Hand Turn-over, draw.
1 International 20" x 6 Type HJ Jolt Roll-over.
4 International 17½ x 24 x 8 Type YF Hand Stripping.
1 International 14 x 22 Type JW Jar ramming, hand strip.
6 Nicholls 14 x 36 Type D Heavy duty type D Combination Jolt Squeeze Strip Machine.

We prefer bids for the entire lot as is where is. Inspection may be made at Plant of

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY,
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REBUILT CENTRIFUGAL COMPRESSORS

2800 CFM, @ 1 lb. North American Turbo Compressor with 20 H.P., 3600 RPM A.C. motor.

1250 CFM, @ 3¼ lbs., 3600 RPM Gen. Elec. with 30 H.P. A.C. motor drive.

450 CFM, 3500 RPM Gen. Elec. with 6.2 H.P. A.C. motor drive.

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Jeffery-Traylor, shaker type CVS-8, 6" wide hand deck, capacity 7 to 8 tons sand per hour; witn 15 cycle, 110 volt, single phase vibrator motor generator set.

Guaranteed electrically and mechanically to give new performance. Can be inspected, priced for quick sale. Write, wire or phone.

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1532 Hamilton Ave. Cleveland, Ohio

For Sale

FOR SALE

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1—Herman 40 x 56 jarr rollover and pattern drawing machine.

1—Niagara blower dust collector.

1—2 ton ladle.

1—2 wheel grinder stand.

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1—Barrel tumbler, 36" x 4'-0".

1—Barrel tumbler, 24" x 3'-0".

Many miscellaneous iron flasks.

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PANGBORN SANDBLAST BARREL
Type GH1 No. 3
In good condition. Inquire

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FOR SALE

Barrett F C F bronze melting cupola furnace. Capacity one (1) ton per hour.

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FOR SALE

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FOR SALE

Detroit Electric Furnace—75 pounds (Iron) capacity. Complete with transformer, wiring, switches and fuses.

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APPROXIMATE CAPACITY 20,000 LBS.
Used, in good condition

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Royer model D. C. combination scrap remover, sand separator and blender.

THE ELYRIA BELTING & MACHINERY CO.,
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EQUIPMENT IN STOCK REBUILT
GUARANTEED IMMEDIATE SHIPMENT
MOLDING MACHINES

5—No. 275-J Osborn 10" Jolt Squeezers.
7—No. 276-J Osborn 13" Jolt Squeezers.
1—30" Tabor Portable Air Rollover Pattern Draw.
1—Tabor Jarr, Squeeze, Flask Lift Stripper Table 18" x 20½".
1—No. 81 Osborn Jolt Squeeze Stripper Machine.
1—Osborn No. 602 Jolt Rollover Pattern Draw.
1—International Jarr Table 24" x 36".
4—Herman Jarr, Table 40" x 60".
4—Herman Jarr Strippers, Table 40" x 60".
6—Herman Jarr Rollover Pattern Draw, Table 30" x 36", 40" x 55", 40" x 60".
1—40" x 50" Tabor Jarr Rollover Pattern Draw.

MISCELLANEOUS ITEMS

4—20" Coombs Riddles 110-VAC.
2—No. 60 Fisher Crucible Furnaces, Style "H".
1—Gas Fired Young Bros. Core Oven 12' 6" deep x 8' wide x 7' 6" high, double doors.
1—Battery (2) Coleman Ovens Gas Fired each 14' deep x 7' wide x 7' 6" high with individual doors.
1—¾" cap. Shuster Power Sprue Cutter.
1—Dings Magnetic Separator type M-1.

SAND MIXERS

1—10-cu. ft. Standard Gear Drive.
1—6' Simpson, speed reducer & 10-H.P. A.C. motor.
1—8' Simpson Mixer.
2—4' Simpson Mixers.

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1—12 x 10 Penna. 360-CFM @ 100 lbs. idler, belt, 60-HP, C.W. slip ring motor, 220/3/60-cy. and control.
1—12 x 12 Chicago N.S.B. 375-CFM @ 100 lbs. with idler, unloader and lubricator.
1—2-stage Ing. Rand size 16 & 10½ x 12, cap. 770-CFM. @ 100 lbs., direct connected to a 125-HP, G.E. Syno. motor, 2300/3/60-cy., exciter, control, after-cooler and tank.

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50—½ to 5-ton, 1 and 2-motor, Fl. and Cage Operated, 220/440-volts, 3-PH., 60-CY. 110 and 230-VDC.

OVERHEAD ELECTRIC TRAVELING CRANES

1 to 50-ton Cap. 18' to 91' 0" span, 220/440-VAC. and 230-VDC. We operate the largest crane Rebuilding Plant in the country, send us your specifications for cranes, Monorail Electric Hoists, Crane Motors, Standard Motors, Steel Buildings & Runways, we can quote you on equipment Rebuilt to your specifications.

ELECTRIC STEEL FURNACE

1—3-ton Heroult, with 1500-KVA transformer, 2300-volts, 3-phase, 60-cycle, Rebuilt to Your Specifications.

T. B. MACCABE CO.

4304 Clarissa St. **Philadelphia, Pa.**

For Sale

FOR SALE

1 Herman Pneumatic 42" Dia. jarr molding machine, bumper type, equipped with auto pressure grease lubrication, air tank 12" dia. x 6' long. Serial No. 2838, never operated. **East Penn Foundry Company, Macungie, Pennsylvania.**

FOR SALE

One complete mold conveyor and overhead sand handling system manufactured by C. O. Bartlett & Snow Co., Cleveland, Ohio. Also tumbling barrels, dust arrestors, sandblast barrels, and other miscellaneous foundry equipment. Address Box 574, The FOUNDRY, Cleveland.

FOR SALE

1 12' No. 2 Pangborn rotary table sand blast, including all motors and dust arrestor. Inspection invited. For further details inquire **Rock Island Stove Company, Rock Island, Illinois.**

FOR SALE

Used Herman 40" x 50" plain jarring machine, rebuilt in 1937. Address Box 540, The FOUNDRY, Cleveland.

FOR SALE

Worthington Feather Valve Air Compressor 7½ x 6—106 cubic feet at 100 lbs., complete with idler, belt, motor, air receiver, pipe and fittings. First class condition. Address Box 568, The FOUNDRY, Cleveland.

Are **YOU** in need of foundry equipment?

Do **YOU** have equipment to sell?

Are **YOU** looking for experienced men?

Do **YOU** want to obtain a position?

If **"Yes"** is your answer to any of the above questions, may we offer the services of the Classified Advertising Department of The FOUNDRY? For rates write *today* to:

The FOUNDRY

Classified Advertising Department

Penton Building **Cleveland**

For Sale

FOR SALE

Several D. C. Motors from ½ H. P. up to 25 H. P.—several makes.

1 Elwell-Parker charging truck for annealing pots.

1 Worthington circulating pump, serial No. 875357, with A. C. motor.

Excess stock of molding machines, several types.

Several sizes of Sly exhaust round tumbling barrels.

1 Band saw, belt-driven, with 5 H. P. D. C. motor.

1 Oliver planer, belt-driven, 24", no motor.

If interested, further information will be given by:

THE EASTERN MALLEABLE IRON COMPANY
WILMINGTON, DELAWARE

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft., 676 ft., 752 ft. & 1300 ft.

ELECTRIC—355 ft., 528 ft., 676 ft., 807 ft., 1302 ft., 1723 ft., 2022 ft., 2300 ft., 2800 ft., 3600 ft., & 5000 ft.

STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft., & 3000 ft.

DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.

GASOLINE—110, 160, 220, 310, 1300 ft.

R. C. STANHOPE, INC.

60 East 42nd St. New York, N. Y.

SPECIAL FALL BARGAINS

Air Compressor Units—Curtis 6 x 6 twin with 15 HP motor and starter-tank-belt and unloader 87 CFM displacement.

Ingersoll-Rand 10 x 10 with 40 H.P. Motor.

Fans—Blowers—Exhausters for cooling, ventilation and dust or fumes removal. Multivane Fans in all st'd. makes and styles for large air volumes at low pressures.

Fan or **Centrifugal** style blowers—Maxon-Premix—from No. 1 to No. 6, Spencer Turbine, Gen. Electric, Am. Blower Co., Sturtevant, Buffalo, Clarge, Ilg etc. for Gas or Oil fuel Combustion.

Rotary Pressure Blowers—Roots-Connersville, Garden City, Green, Piqua, Sturtevant, Am. Gas Furnace Co. etc.

Cupola 30" dia. shell ¾ to 1 ton cap. and larger.

Furnaces for Brass and Aluminum Melting—Hausfeld Tilting open flame 400 lb. brass cap.; Booth Electric 725 lb. brass cap. with instruments and transformer. Stationary Furnaces, swing top for crucibles No. 6 to No. 150 and open top for iron pots up to 300 lb. aluminum.

U. S. Size No. 4 Brass melting furnace.

Molding Machines—Osborn-75J. Osborn No. 401 stationary, jolt-squeeze-rollover-draw 20" x 30". Osborn No. 404-S, No. 405-S and No. 85 Pit Type jolt-squeeze-strippers. Arcade No. 3 "Modern" portable hand operated rollover draw, underneath runout carriage. "Berkshire" 34" wide stationary air squeeze. "Tabor" 8" cyl. air squeeze. "Battenfeld" (Johnston & Jennings) stationary jolt squeeze; 5 in stock. Arcade—portable 2 in stock 8 & 10" cyl. Adams—Stationary hand squeezers 48" wide 2 in stock. Tabor-Air Squeeze Stationary 48" wide, 16" cyl. Mumford—Stationary Air Squeeze 14 x 18" platen. Tabor—Hand operated, portable, Rollover, draw for 20 x 30" flasks or core boxes, 3 in stock. Nichols—10" x 32" Stationary 20 available. Tabor 28" x 41" portable shockless jarring rollover draw.

Crane Ladles 1 & 4 ton, Sly wet Cinder mill.

Sand Blasts—pressure generator tanks with hose & nozzles.

Sand Blast Barrel—New Haven 36 x 46" Motor direct connected.

Sand Blast Tables Pangborn 6' and 8' dia. self contained fine for brass and iron castings.

Blystone Sand Mixer.

Tell us your needs.

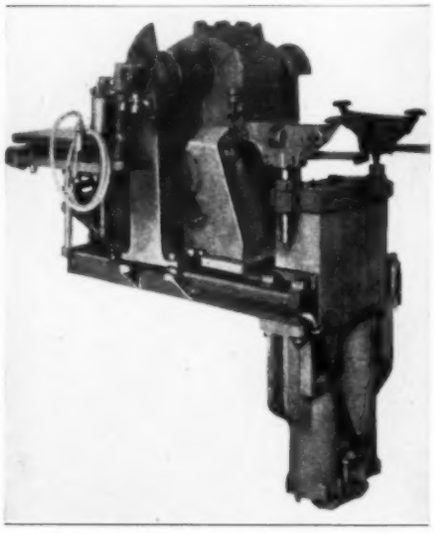
CLIFTON MACHINERY CO.
1023 W. 6th CINCINNATI, O.

"SCULLY-JONES" RECONDITIONED FOUNDRY EQUIPMENT

◆ Ready for immediate shipment, this equipment has been completely rebuilt in our modern machine shop. Prices on request.

INTERNATIONAL MOLDING MACHINES

1 49 x 16″ draw Type "F," fitted with air equalizers, rollers in the draw section and hand operated core box clamps, jar plate 100″ long, 6000 lbs. cap.



INTERNATIONAL TYPE "F"
(Enclosed Model)

48 x 16″ draw Type "F"—4200 lbs. cap. @ 80 lbs., table size 48 x 83″.
37 x 16″ (adjustable draw, can be set to max. of 25″) Type "F" table size 34 x 70″, 3800 lbs. cap. @ 80 lbs. press.
31 x 16″ draw, Type "F" table size 31 x 60″, 2500 lbs. cap. @ 80 lbs. pres., with roll-off table and air equalizers.
42 x 16″ draw Type "F" (with double cylinders) 3400 lbs. cap. @ 80 lbs. pressure.
26 x 8″ draw International Type "F" 27″ x 34″ roll-over table.
26 x 12″ Type "F" International 22 x 40″ roll-over table.

OSBORN MOLDING MACHINES

No. 403 Osborn jolt roll-over and pattern draw, flask cap. 44 x 36″, 12″ draw, with swing-out Mold Table.

No. 602 Osborn jolt roll-over pattern draw, flask cap. max. length 36″—width 26″—11″ draw, 900 lbs. jolt cap.

Herman INDEPENDENT TURN-OVER and PATTERN DRAWING DEVICE MACHINES

32 x 46″ jar roll-over, 30 x 36″ jolt table.
46 x 56″ jar roll-over, 40 x 50″ jolt table.
40 x 60″—15″ dia. cyl. 9500 lbs. cap. @ 80 lbs. press., 42 x 60″ jolt table.

PLAIN JOLTERS, stationary

Osborn, 18 x 36″ table, 6″ dia. cyl. 750 lbs. jolting cap. @ 80 lbs. press.
Arcade, 16 x 24″ table, 6″ dia. cyl. 750 lbs. cap. @ 80 lbs. pressure.

HERMAN BUMPERS

60 x 72″ table, 15,000 lbs. cap. @ 80 lbs. press., 19½″ dia. cyl.
50 x 50″ table, 6100 lbs. cap. @ 80 lbs. pressure.
40 x 50″ table, 6400 lbs. cap. @ 80 lbs. press., 13″ dia. cyl.

MISCELLANEOUS MOLDING MACHINES

Tabor power jolt, power roll-over, power draw, 30 x 40″ roll-over table, 12″ pattern draw.

Osborn jolt roll-over, 21 x 28″ jolt table, 16 x 43″ roll-over table, 19″ dia. cyl. 8-10″ draw, stationary.

Pridmore hand draw, air roll-over and electric jolt, 33 x 25″ table, direct connected to 2 HP GE 3/60/220V AC Induction Motor.

JOLT SQUEEZE & POWER STRIP

Nicholls 11-32″ Type "D" stationary 13-23″ pin centers, 10¼″ squeeze piston, 4⅜″ jolt piston.
No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6″ table 19 x 35″—open end type.
No. 152 Milwaukee, portable, max. pattern draw 6″, pattern length 28″ width 20″, 1200 lbs. cap. @ 80 lbs. press., 22 x 30½″ table.
No. 703-6 Osborn jolt squeeze and strip, 21 x 28″ table, stationary, length of opening in lifting frame 34″, 6″ pattern draw, 8″ cyl. dia. 1000 lbs. jolt. cap. @ 80 lbs. pressure, distance from lifting frame to squeeze head 24¼″, flask length 44½″, with roll off conveyor.
No. 703-5 Osborn, same as above excepting 17 x 35″ table.

JOLT SQUEEZE STRIP

Milwaukee No. 113, portable, 500 lb. cap. @ 80 lb. press. 6″ pattern draw, 16″ x 26″ table—platen size 12″ x 14″—max. pattern length 24″.
Milwaukee No. 113, portable, 500 lb. cap. @ 80 lb. press. 6″ pattern draw, 16″ x 35/ table, open end type, platen size 12″ x 14″.

JOLT SQUEEZERS

No. 276-J Osborn, portable, squeeze cyl. dia. 13″—18 x 26″ table.
No. 275-J Osborn, portable, squeeze cyl. dia. 10″—16 x 20″ table.
Nicholls, 10-32″ stationary, swing-out rod type, adjustable head.

SAND MIXERS-CONDITIONERS-THROWERS

No. 1, 4 ft. dia. Simpson, single muller type, pulley drive.
No. 2 Simpson, double muller type, 6 ft. dia. Pan, complete with 10 HP AC Motor, Starter and Gear Reducer.
No. 3, 8 ft. dia., 11 x 32″ heavy duty type double Mullers, arranged for motor drive, but without motor, with gear reduction and outboard bearing.
B & P SAND CONDITIONER," with AC Motor, 12 x 20″ Stearns 230V Magnetic Pulley, 26 x 50″ screen, 15 x 15 x 33″ Iron Hopper, portable.
Universal SAND THROWER, stationary, on bed plate direct connected to 7½ HP 220V AC Motor.
Model "B" Royer Sand Separator and Blender, cap. 300 lbs. sand per min., portable, with AC Motor.

G. E. CENTRIFUGAL BLOWERS

FD-375, 8500 cu. ft. displ. 1 lb. press. with 2—24″ dia. top vertical discharge openings, 58 HP 220V AC 3600 RPM Motor (welded steel case).
Type T-1, 7200 ft. displ. 1 lb. press. (cast iron frame type) 50/60 220V 3455 RPM AC Motor.

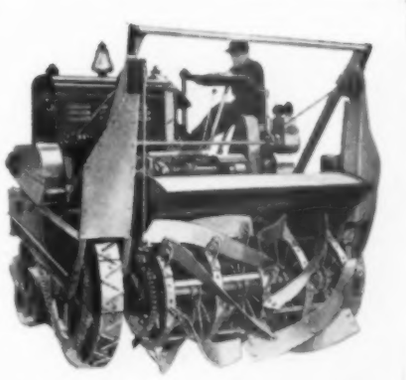
OVERHEAD ELECTRIC TRAVELING CRANES

25-ton Walker, 55 ft. span, with 5-ton Aux. Hoist, Motors 550V DC.
7½-ton New Albany, 48 ft. span, 2-motor Type, 220V DC, cab control.
5-ton Toledo, 31'7″ span, 20″ "I" Beam Girders, 6″ face, 115V DC Motors.
5-ton Bedford, 28 ft. span, Straight "I" Beam Type Girders, cab control, 220V DC Motors, cut steel pinions and gears.
5-ton Shepard 18'5″ span, 1-motor 220V DC, trolley hand racked, bridge hand racked, box girders.
2-ton Detroit LoHed Ice House Type, 26 ft. span, 3-motors, 220V AC, floor control, 9-10 ft. lift.
1-ton Detroit LoHed Type "H" Ice House Cranes, 29 ft. span, double "I" Beam Girders, 220V AC, floor control, 9 ft. vertical lift.

ELECTRIC HOISTS

1000 lb. Shepard, 1 HP 110V DC Motor, with Trolley, 14 ft. lift.
1000 lb. Box Load-Lifter, 1 HP 220V AC Motor, 15 ft. lift, floor control.
2000 lb. Y&T Model 20B Elec. Chain Hoist, 16 ft. lift, 220V AC Motor, floor cont.
2000 lb. Shepard equipped with 2¼ HP 110V DC Motor, 18 ft. lift, floor cont.
2000 lb. Shepard Lift-A-Bout with Trolley, 2¼ HP 110V DC Zobell Motor, 18 ft. lift, floor control, speed 20 FPM.
2000 lb. Northern Hi-Lift lug suspension type for fixed suspension, with 2 HP 220V AC Motor, 20 ft. lift.
2-ton Shepard, stationary, with remote cont. for mounting, with 20 HP 220V AC Motor—speed 80 FPM.
5-ton Detroit, with Top Hook, floor cont. with 5 HP 230V DC Motor.
7½-ton DETROIT equipped with 6½ HP Watson 230V DC Motor.

AMERICAN FDRY. EQIPT. CO. SANDCUTTER



American Heavy Duty Wide Cutting Type "K" size 72, 60″ cutting cyl. 72″ between tractor wheels, 6″ face with Buda Gas Engine.

Pangborn SANDBLAST ROOM Type N-F, double doors, complete with Bucket Elevator, Sand Separator, Hose Machine, perforated floor plates, also Self-Supporting outdoor type Dust Arrestor, 4-hopper type, with self-contained Fan House.

ELECTRIC GRINDERS

11 ft. Hassel SWING FRAME GRINDER, equipped with 10 HP 220/440V AC Motor, ball-bearing, 24 x 3″ wheel.
Black & Decker "Constant Cutting Speed" FLOOR STAND, max. wheel size 24 x 4″, ball-bearing spindle, with 10 HP 230V 1035 RPM DC Motor, totally enclosed. Push Button Control with Magnetic Type Starter.

Above items represent but a portion of our used or reconditioned FOUNDRY and INDUSTRIAL EQUIPMENT BARGAINS . . . Send for our current STOCK LIST No. 69 (just printed) which shows COMPLETE STOCK on hand at our CHICAGO WAREHOUSE and advise as to your exact requirements.

SCULLY-JONES & COMPANY (Foundry Division) 19th & ROCKWELL STS. PHONE LAWNDALE 8770 — CHICAGO, ILLINOIS

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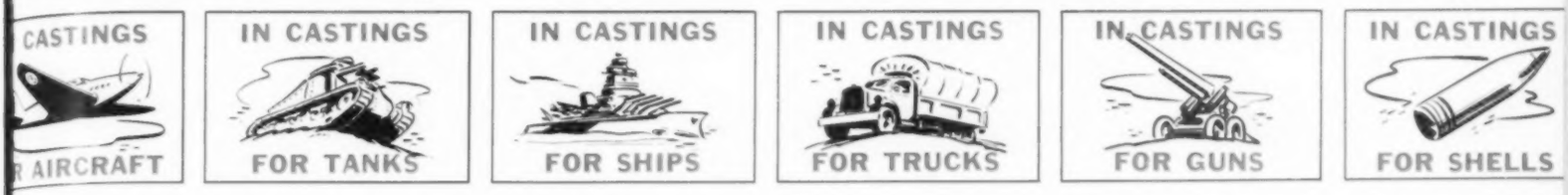
Stevens Facings excel wherever the going is tough



These products do their part in speeding defense production

U. S. Army Fourteen inch Railway Coast Defense Gun Firing—Ewing Galloway Photo

"Everything for a Foundry"

FREDERIC B. STEVENS, Inc.

Detroit **Michigan**

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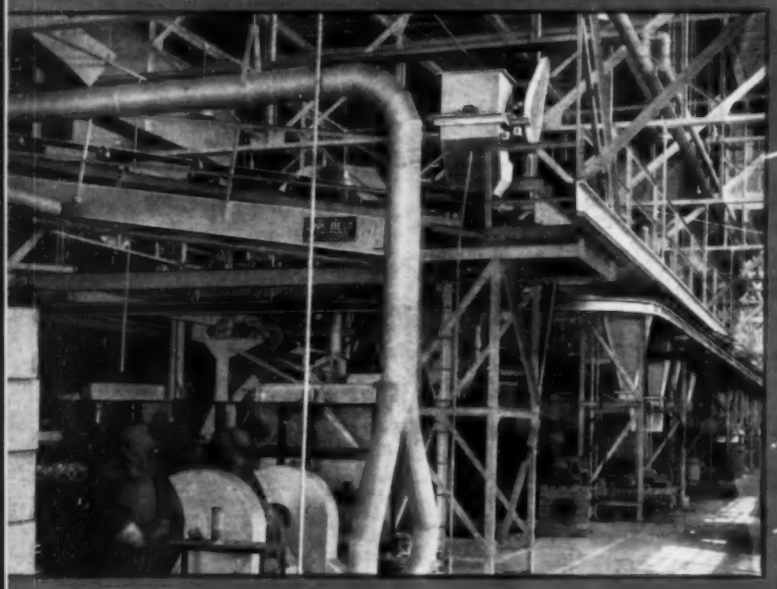
NEW YORK and PENNSYLVANIA . . 93 Stone St., Buffalo, N. Y.
INDIANA . . Hoosier Supply Co., 36 S. Cruse St., Indianapolis, Ind.

CANADA . . Frederic B. Stevens of Canada, Limited
1262 McDougall St. . . . . Windsor, Ontario
2368 Dundas St. West . . . . . Toronto, Ontario

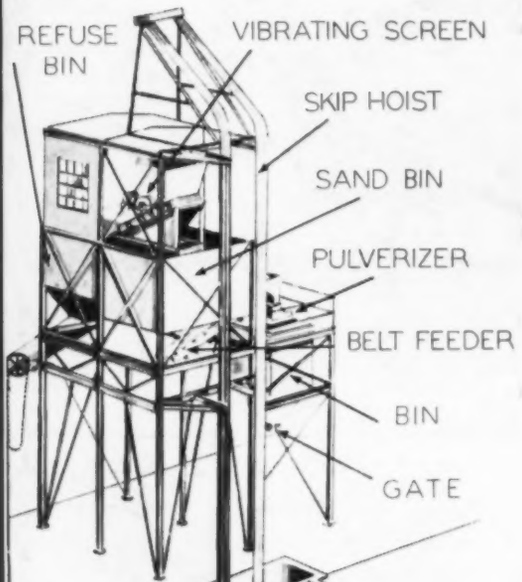
AT WRIGHT AERONAUTICAL CORPORATION

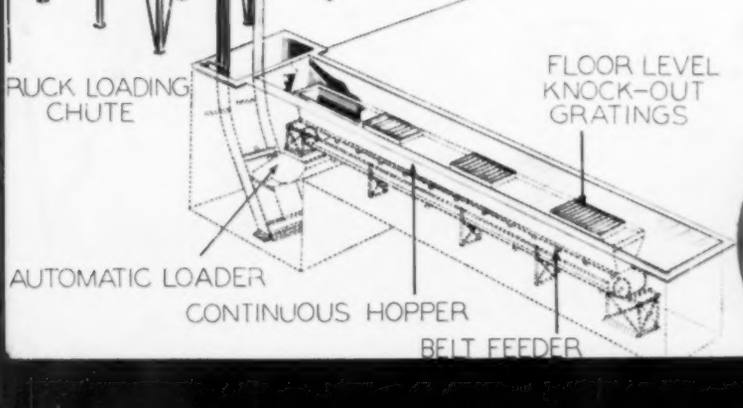
LINK-BELT MECHANICAL SAND HANDLING SPEEDS CASTINGS PRODUCTION

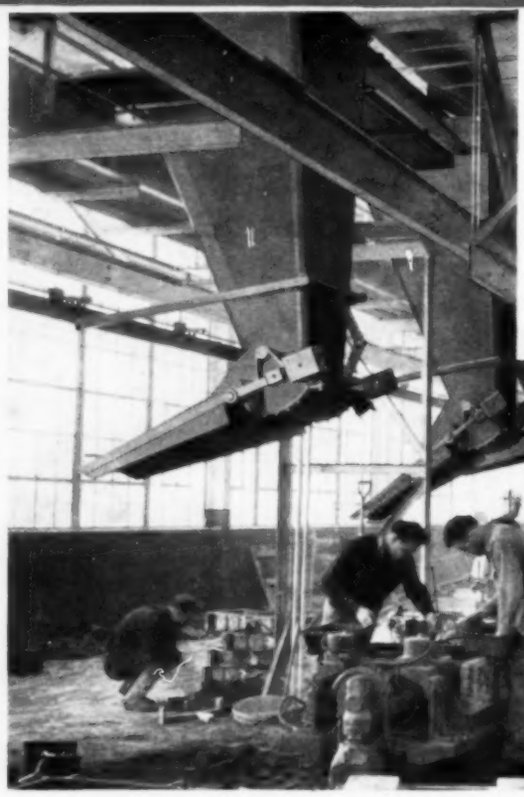


At Aluminum Foundry

in Paterson, N. J. In the Link-Belt unit illustrated below, baked cores from cast aluminum aircraft engine cylinders are reduced to grain size for re-use and separated from metallic and other refuse. These cores have numerous thin crevices to form the fins on the cylinders. Scores of small sharp, needle-like wires are removed from them by this system. At times these cores are tossed into the system practically whole—at other times being put through a jaw crusher. Capacity, 10 tons per hour.







At Magnesium Foundry

in Paterson, N. J. Upper left picture shows portion of Link-Belt belt conveyor system for delivering prepared sand to individual overhead hoppers and returning the excess to storage bin. In photograph above, right, are seen head of bucket elevator and the revolving screen to which elevator delivers crushed cores. Some of the individual sand supply hoppers over molding machines are shown in picture below.

● Effective, scientific sand preparation and conditioning—in both large and small foundries—are economically accomplished with Link-Belt standardized units engineered to fit specific conditions. Link-Belt designs offer maximum flexibility, efficiency and economy of layout. Send for Catalog No. 1839-A.

LINK-BELT COMPANY

Engineers and Manufacturers of Materials Handling and Mechanical Power Transmission Machinery Since 1875

CHICAGO PHILADELPHIA ATLANTA INDIANAPOLIS DALLAS
SAN FRANCISCO TORONTO

Offices, Warehouses and Distributors in Principal Cities

LINK-BELT CONVEYORS